United States
Department of
Agriculture

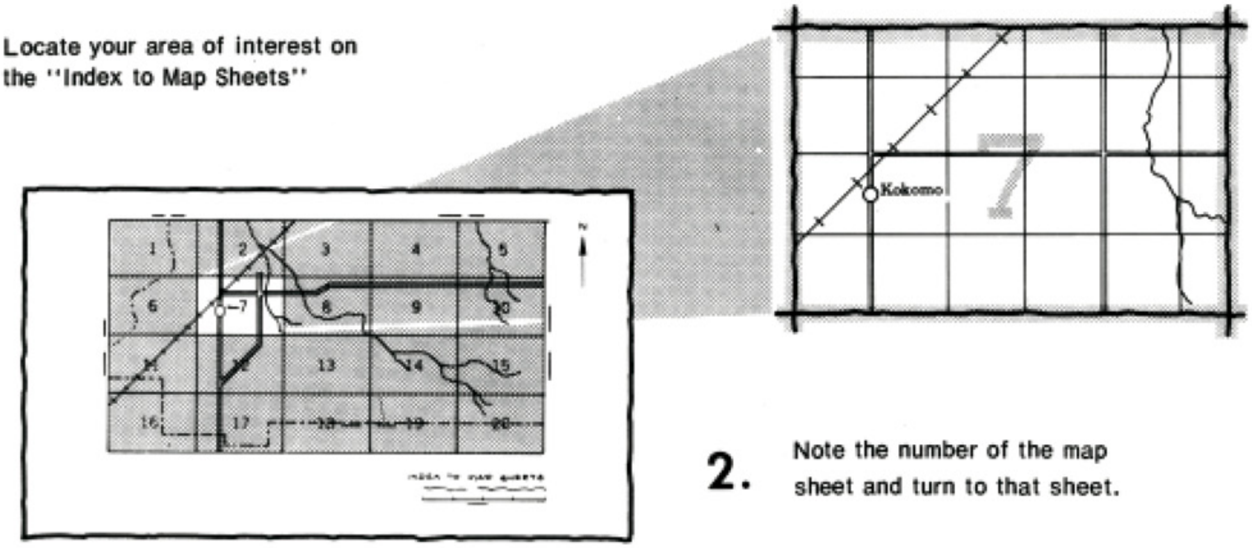
Soil
Conservation
Service

In cooperation with the
Alabama Agricultural
Experiment Station,
the Alabama Soil and Water
Conservation Committee, and
the Alabama Cooperative
Extension Service

Soil Survey of Shelby County, Alabama

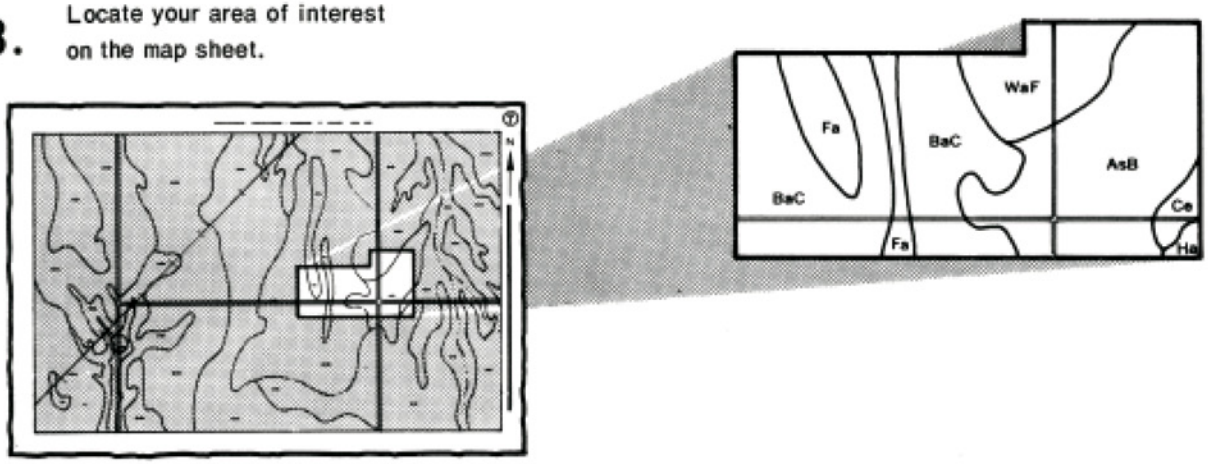
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"

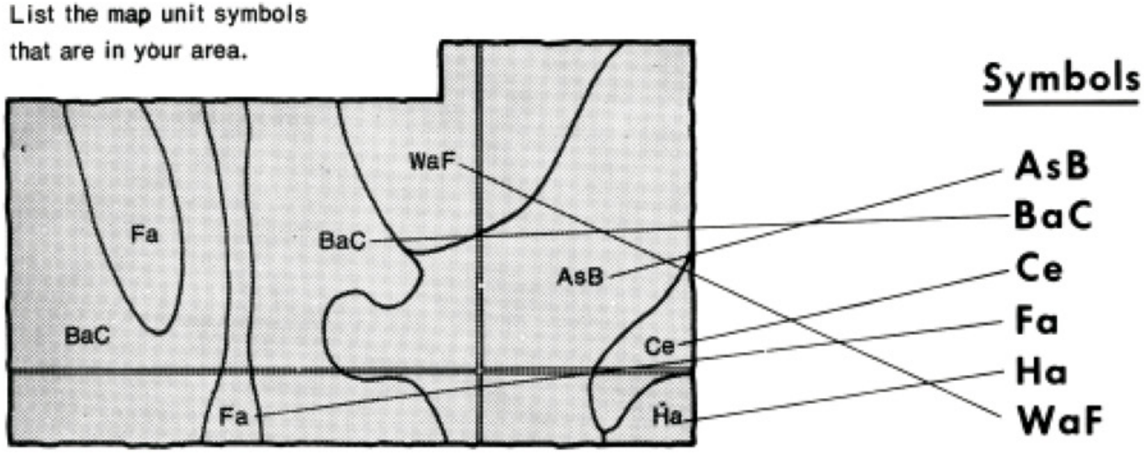


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

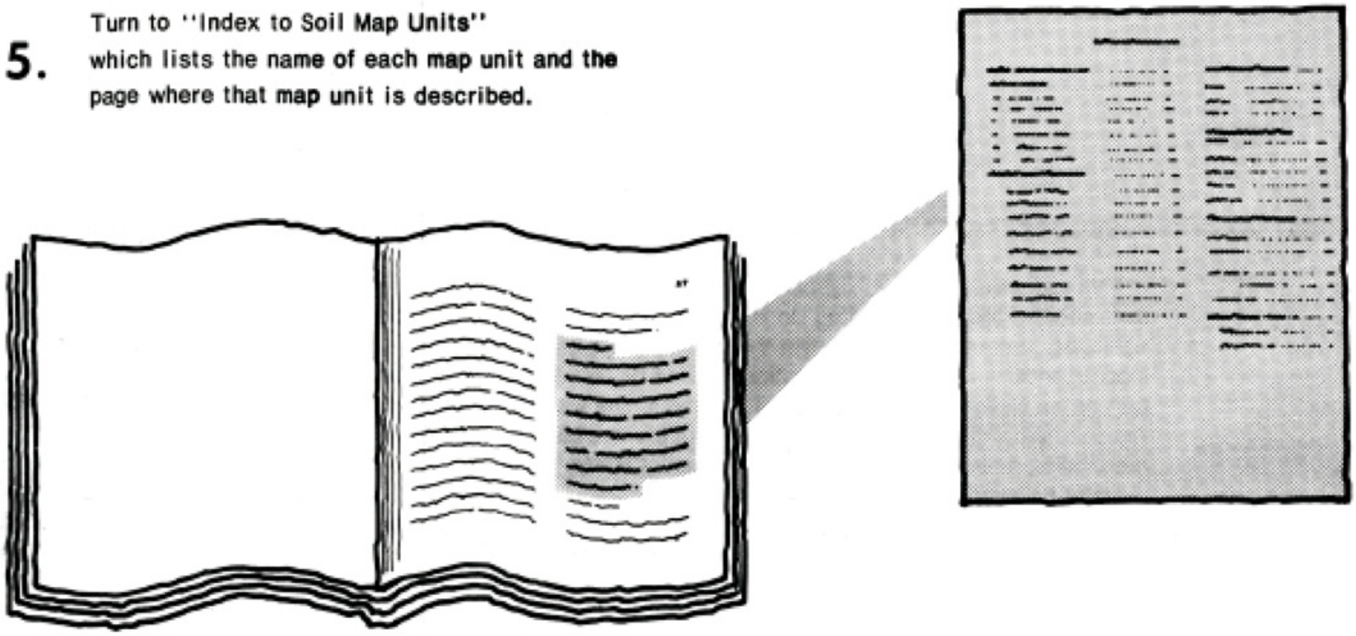


4. List the map unit symbols that are in your area.

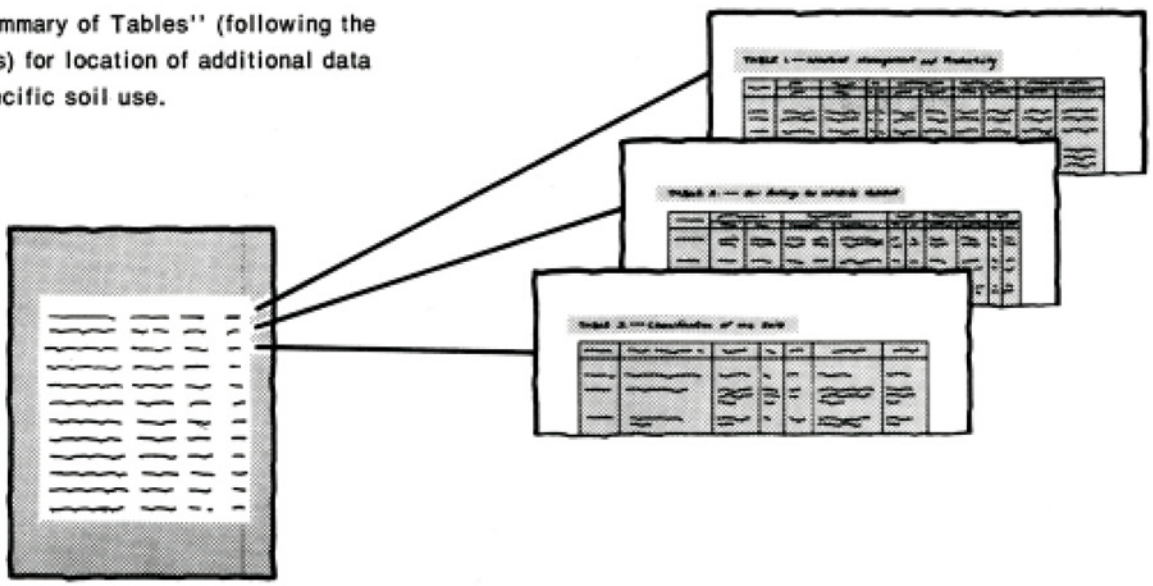


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1980. Soil names and descriptions were approved in 1982. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service, the Alabama Agricultural Experiment Station, the Alabama Soil and Water Conservation Committee, and the Alabama Cooperative Extension Service. It is part of the technical assistance furnished to the Shelby County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Because of the growth of the city of Birmingham, much of the land in Shelby County is in residential use.

Contents

Soil Series

Issued July 1984

Index to Map Units

Summary of Tables

Foreword

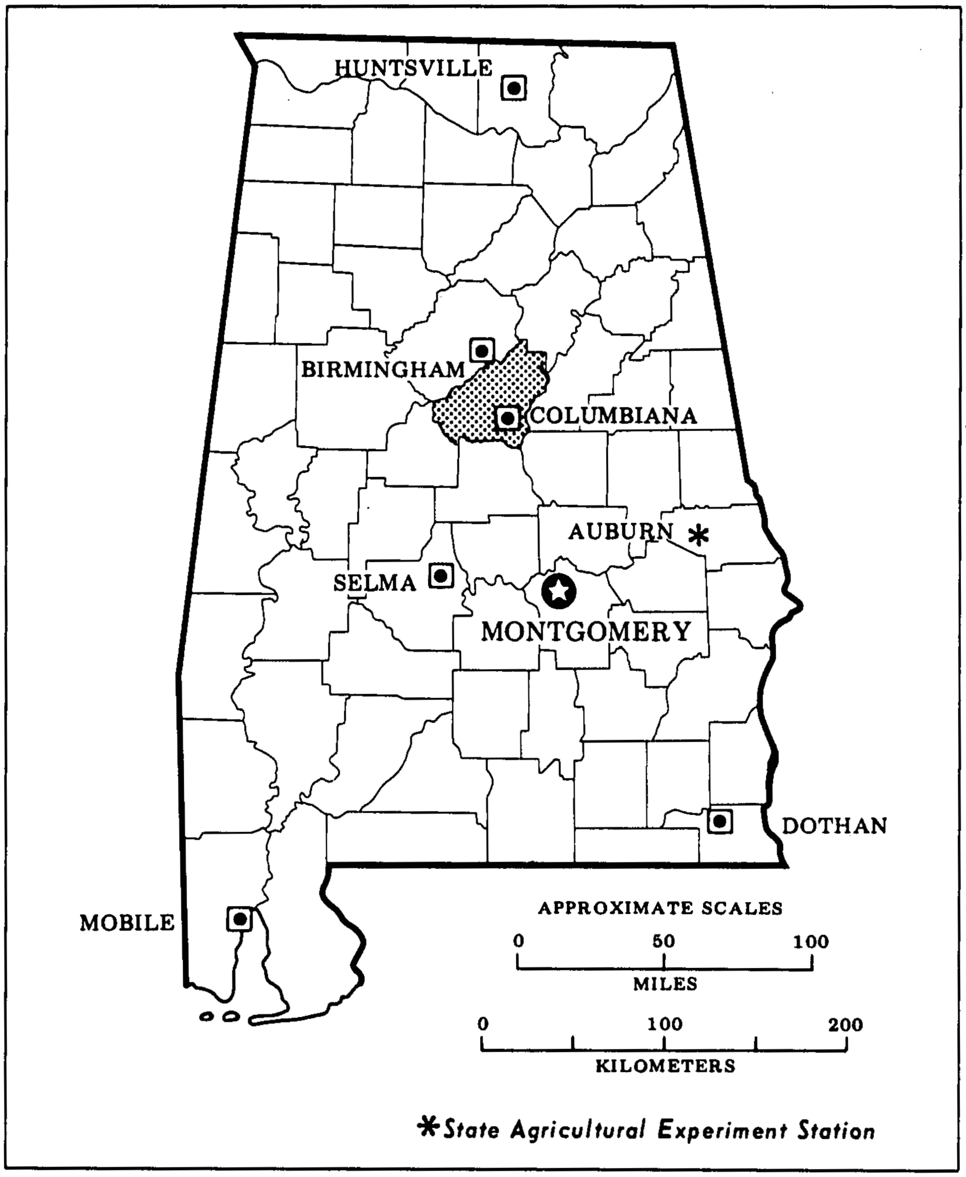
This soil survey contains information that can be used in land-planning programs in Shelby County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Ernest V. Todd
State Conservationist
Soil Conservation Service



Location of Shelby County in Alabama.

Soil Survey of Shelby County, Alabama

By Robert W. Stevens, Soil Conservation Service

Fieldwork by Cleo Stubbs, Robert W. Stevens, and Harold B. Neal, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with the Alabama Agricultural Experiment Station,
the Alabama Soil and Water Conservation Committee,
and the Alabama Cooperative Extension Service

General Nature of the Survey Area

SHELBY COUNTY is in the central part of Alabama. Columbiana, the county seat, has a population of 2,655. The total area of the county including areas of water is about 806 square miles, or 514,800 acres. The total land area is 797 square miles, or 510,360 acres.

The municipalities and unincorporated areas in Shelby County have a total population of 66,300. The largest municipality is Albaster, followed by Pelham, Montevallo, Columbiana, Helena, Calera, Vincent, Harpersville, Wilsonville, Wilton, and Leeds. About 43 percent of the population of Shelby County resides in these incorporated areas. The rest of the population reside in unincorporated areas such as Pea Ridge, Dogwood, Aldrich, Maylene, Elliotsville, Saginaw, Shelby, Chelsea, Dunnavant, Vandiver, Sterrett, and Westover.

Many subdivisions have been built in the northern area, including the two planned communities, Riverchase and Inverness. The improved routes of transportation, available land, and short distance to Birmingham have contributed to economic growth, population growth, and industrial development. The once-rural area of Shelby County is rapidly becoming urbanized.

An earlier survey of Shelby County was published in 1920 (*10*). This survey updates that earlier survey and provides additional information and more detailed maps.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Shelby County has long, hot summers because moist, tropical air from the Gulf of Mexico persistently covers the area. Winters are cool and fairly short, with only a rare cold wave that doesn't moderate in 1 to 2 days. Precipitation is fairly heavy throughout the year. It reaches a slight peak in winter with prolonged droughts being rare. Summer precipitation, mainly afternoon thundershowers, is normally adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Calera, Alabama, in the period 1955 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 46 degrees F, and the average daily minimum temperature is 33 degrees. The lowest temperature on record, which occurred at Calera on January 30, 1966, is -2 degrees. In summer the average temperature is 78 degrees, and the average daily maximum temperature is 90 degrees. The highest recorded temperature, which occurred at Calera on July 7, 1977, is 105 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 55.53 inches. Of this, 27 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 22 inches. The heaviest 1-day rainfall during the period of record was 6.45 inches at Calera on March 29, 1951. Thunderstorms occur on about 60 days each year, and most occur in summer.

The average seasonal snowfall is 1 inch. The greatest snow depth at any one time during the period of record was 8 inches. On the average there are no days with at least 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 85 percent. Humidity is higher at night, and the average at dawn is about 60 percent. The sun shines 65 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 9 miles per hour, in winter.

History

The survey area was first settled by Indians. The tribes that we know are the Choctaws, Muscogees, Upper Creeks, Alibamos, Coshatees, and Chickasaws. Hernando De Soto was the first European to enter what is now Shelby County.

The first non-Indian settlements were at or near Montevallo, Harpersville, Wilsonville, and Pelham. These settlements took place after the Battle of Horseshoe Bend. The Indian villages disappeared during this time and by 1817 were gone.

Shelby County was created by an act of the Territorial Legislature in 1818. It included areas that are now parts of St. Clair, Jefferson, Talladega, Chilton, and Bibb Counties. Shelby County was named for Governor Issac Shelby of Kentucky, a Revolutionary War hero and Indian fighter.

During the Civil War, Union forces under General James Wilson raided Shelby County. Coal mines, blast furnaces, rolling mills, grist mills, railroad shops, railroad depots, and vast amounts of personal property were destroyed throughout the county (*8*).

Much of the rebirth of Shelby County took place with the rise of Birmingham to the north. Iron ore, coal, and limestone along with cropland and woodland became the natural resources that the county based its livelihood on.

Geology

Shelby County is the most geologically diverse area in Alabama, if not the southeastern United States. Rocks and sediments range in age from Cambrian to Cretaceous, with Pleistocene deposits along rivers and creeks. Many faults and various degrees of metamorphism further complicate the geology of the county. Four major geologic provinces occur in Shelby County. These are the Tennessee section of the Valley and Ridge province, the Cumberland Plateau section of the Appalachian Plateaus province, the Ashland Plateau section of the Piedmont province, and the Coastal Plain province (*1*).

The Tennessee section of the Valley and Ridge province makes up most of the county. It is made up of various formations that formed from shale, siltstone, sandstone, dolomite, limestone, and cherty limestone. This province is east and south of the Helena Fault, which follows roughly along County Highway 17.

The Cumberland Plateau section of the Appalachian Plateaus province is west and north of the Helena Fault. It is in the Pottsville Formation in which coal is extensively mined. The Pottsville Formation is made up mainly of sandstone, siltstone, and shale.

The Ashland Plateau section of the Piedmont province is south of County Highway 25 between Calera and Columbiana and west of County Highway 47 south of Columbiana. This province is made up of various metamorphic rocks such as slate, phyllite, and marble.

The Coastal Plain province is south of Montevallo and Calera. It is in the Tuscaloosa Formation. The Tuscaloosa Formation is made up of unconsolidated marine sediments of sands, clays, and gravels.

Recent fluvial sediments have been deposited along the major rivers and streams. These deposits vary in texture depending on the source area of the sediments and the location on the terrace (*1*).

Natural Resources

Minerals

Coal reserves are abundant in the Pottsville Formation, which occurs in the western and northern parts of the county. Underground and strip mining have occurred throughout the area. Even with the increased demand for coal, mining has become less profitable because the coal seams are tilted.

Major deposits of high quality limestone and dolomite occur in the midwestern part of the county, and less desirable or less extensive deposits occur throughout the county. The Newala Formation is mined most extensively. Agricultural limestone and cement are shipped in large amounts. Limestone and road material are quarried in the Newala and other limestone or dolomite formations, such as the Bibb, Brierfield, Ketona, Copper Ridge, Chepultepec, Longview, Odenville, Mosheim, Lenoir, and Little Oak. The Fort Payne and Knox Cherts, which are used for road material, are locally extensive (*9*).

Brown iron ore (limonite) has been mined at Shelby, on Columbiana Mountain, and southwest of Montevallo near Brierfield. No mining of iron ore is occurring at this time.

Small deposits of gravel are in several alluvial deposits along the Coosa River and in the Pottsville Formation, especially between Dogwood and Pea Ridge. Other small deposits of gravel are in the Coastal Plain.

Other minerals and rocks that are in the county are used in varying degrees. Barite has been mined on a small scale above Wilsonville. Refractory silts have been mined near Montevallo and Calera. A low grade marble occurs southwest of Shelby, although it has not been used. Some of the shale, which is abundant in Shelby County, has been tested successfully for light-weight aggregates. Natural gas occurs in the Pottsville Formation, but in amounts that cannot be economically extracted at this time.

Water

Shelby County has an abundant supply of water both above and below ground. Two major rivers, the Coosa and Cahaba and their many tributaries, provide water for domestic, industrial, and agricultural use. The ground water is high in minerals and may need to be filtered. Lay Lake, on the Coosa River, is the largest impoundment. Lake Purdy is a water-works lake for the City of Birmingham in nearby Jefferson County. Many lakes and ponds, which range to several hundred acres, are throughout the county. Throughout the limestone valleys, the stream drainage is supplemented by numerous subterranean channels.

Forests

About 388,000 acres, 76 percent of the total land area in the county, is forest. A major pine seedling nursery is located south of Harpersville.

Farming

Cotton and soybeans are the major cultivated crops in Shelby County. Many soybean farmers are now planting small grains, especially wheat, during the winter to double crop their land. Milk production was once extensive, but there are now only seventeen dairies in the survey area. There are several large and medium sized, and many small, producers of beef.

Many part-time farmers, who operate small farms throughout the county, produce varied agronomic, woodland, and animal crops to supplement their income. They produce truck crops, Christmas trees, horticultural and ornamental plants, turf grass, poultry, and swine.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Nauvoo-Sunlight

Moderately deep and shallow, gently sloping to steep, well drained soils that have a loamy subsoil; formed in residuum of sandstone, siltstone, and shale or of interbedded sandstone, siltstone, and shale

Most areas of this map unit are in the western and northwestern parts of the county. The landscape consists of broad dissected uplands that have narrow ridgetops, steep side slopes, and narrow drainageways.

This unit makes up about 26 percent of the county. It is 51 percent Nauvoo soils, 21 percent Sunlight soils, and 28 percent soils of minor extent. Nauvoo soils are moderately deep and mainly on ridgetops, and Sunlight soils are shallow and are on side slopes. Both soils are well drained. Nauvoo soils have a surface layer of sandy loam, and Sunlight soils have a surface layer of channery silt loam.

The soils of minor extent are moderately well drained Quitman soils along narrow drainageways, well drained Pirum soils on steep side slopes, and well drained Townley soils on positions similar to those of Nauvoo and Sunlight soils.

Suitability of these soils for use as woodland is fair, and woodland is the main use. Small areas are used for cultivated crops and pasture. Potential for cultivated crops and pasture is poor. Steep slopes are the main limitation.

The soils in this unit have poor suitability for residential and other urban uses. Steep slopes and shallowness of Sunlight soils are severe limitations. Areas of Nauvoo soils where slope is not a limitation are suited to residential uses.

Suitability of these soils for use as habitat for woodland wildlife is fair.

2. Townley-Sunlight

Moderately deep and shallow, undulating to steep, well drained soils that have a clayey or loamy subsoil; formed in residuum of shale and siltstone

Most areas of this map unit are in the central and northern parts of the county. The landscape consists of dissected hills with narrow ridgetops, steep side slopes, and narrow drainageways.

This unit makes up about 28 percent of the county. It is 57 percent Townley soils, 16 percent Sunlight soils, and 27 percent soils of minor extent. Townley soils are moderately deep and are on ridgetops and side slopes. Sunlight soils are shallow and are mainly on short, steep side slopes. Both soils are well drained. Townley soils have a surface layer of silt loam, and Sunlight soils have a surface layer of channery silt loam.

The soils of minor extent are moderately well drained Quitman soils along drainageways and well drained Nauvoo soils on narrow ridgetops.

The soils in this unit are used mainly for woodland. Suitability for woodland use and management is fair. Suitability is poor for cultivated crops and is fair for pasture. Slope restricts the use of equipment in pasture areas. Slope gradient and erosion are severe limitations for cultivated crops.

These soils are poorly suited to residential and other urban uses. Depth to rock, steep slopes, and slow permeability are severe limitations.

Suitability of these soils for use as habitat for woodland wildlife is good.

3. Weogufka-Tatum

Shallow and deep, undulating to steep, well drained soils that have a loamy or clayey subsoil; formed in residuum of slate, phyllite, or schist

Most areas of this map unit are in the south-central part of the county. The landscape consists of broadly dissected uplands with narrow ridgetops, moderately steep and steep side slopes, and narrow drainageways.

This unit makes up about 8 percent of the county. It is 48 percent Weogufka soils, 19 percent Tatum soils, and 33 percent soils of minor extent. Weogufka and Tatum soils are on ridgetops and side slopes. Weogufka soils are shallow, and Tatum soils are deep. Both soils are well drained. Weogufka soils have a surface layer of very channery silt loam, and Tatum soils have a surface layer of silt loam.

Of minor extent are moderately well drained Quitman soils along drainageways. Also of minor extent are areas of rock outcrops.

Suitability for woodland is fair, and this is the main use. Suitability for cultivated crops and pasture is poor. Slope gradient, shallowness, and a stony surface are the main limitations.

The soils in this map unit are poorly suited to most residential and urban uses. Shallowness, low strength, and steep slopes are severe limitations.

Suitability for use as habitat for woodland wildlife is good.

4. Nella-Mountainburg

Deep and shallow, moderately steep and steep, well drained soils that have a loamy subsoil; formed in colluvium and residuum of sandstone

Areas of this map unit are in the northern and northwestern parts of the county. The landscape consists of long parallel mountains with narrow ridgetops, moderately steep and steep side slopes, bluffs, and escarpments.

This unit makes up about 9 percent of the county. It is 48 percent Nella soils, 19 percent Mountainburg soils, and 33 percent soils of minor extent. Nella soils are deep and are on toe slopes and the lower part of mountainsides. Mountainburg soils are shallow and are on the upper part of mountainsides and mountaintops. Both soils are well drained. Mountainburg soils have a surface layer of gravelly sandy loam, and Nella soils have a surface layer of cobbly sandy loam.

The soils of minor extent are well drained Hanceville soils on mountaintops, well drained Gorgas soils on mountainsides, and well drained Townley soils on ridgetops and side slopes. Also included are areas of rock outcrops (fig. 1).

Most of the acreage is used for woodland. Suitability for this use is fair. This unit is unsuited to use for cultivated crops and pasture. Slope gradient, large stones on the surface, and shallowness of the Mountainburg soils are severe limitations.

This unit is unsuited to residential and urban uses. Slope gradient and shallowness over rock are severe limitations.

Suitability for use as habitat for woodland wildlife is good.

5. Minvale-Bodine-Fullerton

Deep, moderately steep and steep, well drained and somewhat excessively drained soils that have a loamy or clayey subsoil formed in residuum of cherty limestone

Most areas of this map unit are in the north-central and northeastern parts of the county. The landscape consists of long ridges with steep side slopes and narrow ridgetops.

This unit makes up about 9 percent of the county. It is 26 percent Minvale soils, 18 percent Bodine soils, 17 percent Fullerton soils, and 39 percent soils of minor extent. All of these soils are on broad to narrow ridges. Bodine soils are somewhat excessively drained, and Minvale and Fullerton soils are well drained. All of these soils have a surface layer of dark brown cherty silt loam.

The soils of minor extent are well drained Dewey soils in valleys and moderately well drained Quitman soils along drainageways.

In most areas the soils are used for woodland, and suitability for this use is fair. These soils are unsuited to cultivated crops and pasture because of steep slopes and low available water capacity.

Suitability for residential and urban uses is poor. Slope is a severe limitation.

Suitability for use as habitat for woodland wildlife is good.

6. Allen-Quitman

Deep, nearly level to sloping, well drained and moderately well drained soils that have a loamy subsoil; formed in alluvium, colluvium, and limestone residuum

Most areas of this map unit are in the eastern part of the county along the Coosa River. The landscape consists of broad, nearly level terraces and low, gently sloping to moderately steep hills with many drainageways and depressional areas.

This unit makes up about 12 percent of the county. It is 46 percent Allen soils, 14 percent Quitman soils, and 40 percent soils of minor extent. Allen soils are well drained, and Quitman soils are moderately well drained. Allen soils are on high terraces, and Quitman soils are along drainageways. Both soils have a surface layer of loam.

The soils of minor extent are somewhat poorly drained Tupelo soils in depressional areas and well drained Decatur, Dewey, Fullerton, and Minvale soils on uplands.

The soils in this unit are used mainly for cultivated crops and pasture. Suitability for these uses is good. Suitability for residential and other urban uses is fair. Suitability for use as habitat for woodland wildlife is good.

Figure 1.—Outcrops of sandstone bedrock in an area of the Nella-Mountainburg general soil map unit.

7. Minvale-Etowah-Tupelo

Deep, nearly level to moderately steep, well drained and somewhat poorly drained soils that have a loamy or clayey subsoil; formed in residuum of limestone or cherty limestone and in alluvium

Areas of this map unit are mainly in broad limestone valleys in the midwestern part of the county. The landscape consists of nearly level to moderately steep uplands with narrow drainageways.

This unit makes up about 6 percent of the county. It is 23 percent Minvale soils, 22 percent Etowah soils, 15 percent Tupelo soils, and 40 percent soils of minor extent. Minvale and Etowah soils are well drained and are on terraces and footslopes. Tupelo soils are somewhat poorly drained and are along drainageways and in depressional areas.

The soils of minor extent are well drained Decatur, Dewey, and Fullerton soils and moderately well drained Quitman soils along drainageways.

Most of the acreage is used mainly for cultivated crops and pasture. Suitability for these uses is fair.

Minvale and Etowah soils are well suited to residential and urban uses. Tupelo soils are poorly suited because of wetness and slow permeability.

The soils in this unit are well suited to woodland use and management. Suitability for development of wildlife habitat is good.

8. Smithdale-Greenville

Deep, undulating to rolling, well drained soils that have a loamy or clayey subsoil; formed in coastal plain marine sediments

Areas of this map unit are along the Chilton-Shelby County line in the southern part of the county. The landscape is dissected uplands with narrow to wide ridgetops, moderately sloping side slopes, and narrow drainageways.

This map unit makes up slightly less than 1 percent of the county. It is 68 percent Smithdale soils, 19 percent Greenville soils, and 13 percent soils of minor extent. Smithdale and Greenville soils are on dissected uplands. Both soils are well drained. Smithdale soils have a sandy loam surface layer, and Greenville soils have a loam surface layer.

The soils of minor extent are soils that are similar to Smithdale soils except that they have yellower color or more clay in the subsoil and soils that are similar to Greenville soils except that they are less than 60 inches thick. Also included are moderately well drained Quitman soils along drainageways.

The soils in this map unit are used for cultivated crops, pasture, and woodland. Suitability is good for cultivated crops, pasture, woodland, and residential development. These soils are well suited to use as woodland wildlife habitat.

9. Choccolocco-Sterrett

Deep, nearly level, well drained and somewhat poorly drained soils that have a loamy subsoil; formed in fluvial deposits

Areas of this map unit are along the flood plain of major tributaries of the Coosa River. These soils are nearly level.

This unit makes up slightly more than 1 percent of the county. It is 45 percent Choccolocco soils, 40 percent Sterrett soils, and 15 percent soils of minor extent. Choccolocco soils are well drained, have a loam surface layer, and are on levees. Sterrett soils are somewhat poorly drained, have a silt loam surface layer, and are in lower areas adjacent to uplands.

The soils of minor extent are moderately well drained Quitman soils.

Most of the acreage is used for woodland, but small areas are used for pasture and cultivated crops. Suitability for woodland use and management is good. Suitability is poor for cultivated crops and is fair for pasture. Flooding and wetness are the main limitations for cultivated crops and pasture. Suitability is good for woodland and wetland wildlife habitat. Suitability for residential and other urban uses is poor. Flooding and wetness are severe limitations.

Broad Land Use Considerations

Deciding which land should be used for urban development is an important issue in the survey area. Each year a considerable amount of land is developed for urban uses. Suburban sprawl from Birmingham in nearby Jefferson County is covering northern Shelby County with planned communities and subdivisions. The general soil map can be helpful in planning general projected growth of urban areas, but it should not be used for selecting sites for specific structures. The development of soil areas with easily correctable unfavorable characteristics may be more advantageous than irreversible development of important farmland. Information about specific soils in this survey can be helpful in planning future land use patterns.

Areas of soils that have unfavorable characteristics for urban development are extensive in Shelby County. The Nauvoo-Sunlight, Townley-Sunlight, Weogufka-Tatum, Nella-Mountainburg, and parts of the Minvale-Bodine-Fullerton units are poorly suited to urban uses because of limited depth to rock and steep side slopes. Slow permeability is a limitation in parts of the Townley-Sunlight and the Minvale-Etowah-Tupelo units. Wetness and flooding are serious limitations in parts of the Choccolocco-Sterrett, Allen-Quitman, and Minvale-Etowah-Tupelo units.

The Allen-Quitman and Smithdale-Greenville units and parts of the Choccolocco-Sterrett and Minvale-Etowah-Tupelo units are well suited to farming. Other units are generally poorly suited because of slope and limited depth to rock.

Most of the county is well suited to fairly suited to woodland and timber production. In the Nauvoo-Sunlight, Townley-Sunlight, Weogufka-Tatum, and Nella-Mountainburg units, the limited depth of the root zone and steep slopes are limitations that affect tree growth and harvesting.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Townley silt loam, 4 to 12 percent slopes, is one of several phases in the Townley series.

Some map units are made up of two or more major soils. These map units are called soil complexes or soil associations.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Nauvoo-Sunlight complex, 8 to 15 percent slopes, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Nella-Mountainburg association, steep, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

AnB—Allen loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is in valleys and on high river terraces underlain by limestone.

Typically, the surface layer is yellowish brown loam about 5 inches thick. The upper part of the subsoil is yellowish red loam that extends to a depth of 11 inches. The lower part is mottled yellow, brown, and red. It is loam to a depth of 54 inches and is sandy clay loam below 54 inches.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid. Permeability is moderate, and available water capacity is moderate or high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and easily penetrated by plant roots. Runoff is medium.

Included with this soil in mapping are areas of Decatur, Dewey, Quitman, and Tupelo soils. Decatur and Dewey soils are on knolls, and Quitman and Tupelo soils are in depressional areas (fig. 2). Included soils make up about 20 percent of the unit.

This Allen soil is used mainly for cultivated crops and pasture. It is also used for woodland (fig. 3) and urban development.

Figure 2.—Allen loam, 2 to 6 percent slopes, is well suited to cultivated crops, but some of the included soils are subject to ponding.

This soil is well suited to cultivated crops. The main limitation is the short slopes, which make applying conservation practices difficult. Practices that can be used to control erosion include minimum tillage; contour farming; using suitable cropping systems; terracing, where possible; constructing diversions; and grassed waterways.

This soil is well suited to hay and pasture. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil is well suited to the production of loblolly pine. There are few limitations for woodland use and management. Suitability for use as habitat for woodland wildlife is good.

This soil has fair suitability for urban development. For septic tank absorption fields, moderate permeability is a limitation, but the limitation can generally be overcome by increasing the size of the absorption field. Buildings and roads should be designed to offset the limited ability of the soil to support a load.

This Allen soil is in capability subclass IIe and in woodland group 3o.

AnC—Allen loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is in valleys and on high river terraces underlain by limestone. Slope ranges from 6 to 10 percent.

Typically, the surface layer is yellowish brown loam about 5 inches thick. The upper part of the subsoil is yellowish red loam that extends to a depth of 11 inches. The lower part is mottled brown, yellow, and red. It is loam to a depth of 54 inches and is sandy clay loam below 54 inches.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid. Permeability is moderate, and available water capacity is moderate or high. This soil has good tilth and can be

Figure 3.—A christmas tree plantation in an area of Allen loam, 2 to 6 percent slopes.

worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots. Runoff is medium.

Included with this soil in mapping are areas of Dewey, Decatur, Quitman, and Tupelo soils. Included soils make up about 20 percent of this map unit.

This Allen soil is used mainly for pasture and cultivated crops. It is also used for woodland and urban development.

This soil is well suited to hay and pasture. The use of equipment can be limited by slope. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil has fair suitability for cultivated crops. It is limited mainly by the short slopes, which make applying conservation practices difficult. Practices that can be used to control erosion include minimum tillage; contour farming; using suitable cropping systems; terracing, where possible; and constructing diversions and grassed waterways.

This soil is well suited to the production of loblolly pine. There are few limitations for woodland use and management. Management that minimizes the risk of erosion is essential for continued maximum use of the soil. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for urban development. For septic tank absorption fields, moderate permeability is a limitation, but the limitation can generally be overcome by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of the soil to support a load. Erosion is a hazard in the steeper areas. Only the part of a site that is used for construction should be disturbed.

This Allen soil is in capability subclass IIIe and in woodland group 3o.

AqC—Allen-Quitman-Urban land complex, 0 to 10 percent slopes. This map unit consists of areas of Allen and Quitman soils and Urban land that are so intermingled that it was not practical to map them separately at the scale used in mapping. These areas are well drained and moderately well drained, level to sloping, deep soils and Urban land on terraces and along drainageways.

Allen loam makes up about 35 percent of each mapped area. Typically, the surface layer is yellowish brown loam about 5 inches thick. The upper part of the subsoil is yellowish red loam that extends to a depth of 11 inches. The lower part is mottled yellow, brown, and red loam to a depth of 54 inches. It is sandy clay loam below 54 inches.

The Allen soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid. Permeability is moderate, and available water capacity is moderate or high. The root zone is deep and is easily penetrated by plant roots.

Quitman loam makes up about 30 percent of each mapped area. Typically, the surface layer is yellowish brown loam about 6 inches thick. The upper part of the subsoil is olive yellow loam that extends to a depth of 35 inches. The lower part is mottled brown and gray loam that extends to a depth of 70 inches or more.

The Quitman soil is medium in natural fertility and organic matter content. Reaction is medium acid or strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is medium.

Urban land makes up about 25 percent of each mapped area. It consists of areas that have been altered to the extent that classification of the soils is not practical. Urban land includes areas covered by buildings, garages, streets, sidewalks, and parking lots and areas that have been significantly disturbed by cutting, filling, or grading.

Included in mapping are a few small areas of Dewey, Decatur, Etowah, Sterrett, and Tupelo soils. Included soils make up about 15 percent of this map unit.

The Allen soil has fair suitability for urban development. For septic tank absorption fields, the limitation of moderate permeability can usually be overcome by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of the soil to support a load. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. The hazard of corrosion is low for uncoated steel and is moderate for concrete.

The Quitman soil is poorly suited to urban uses. A seasonal high water table is present during winter, and drainage should be provided. Septic tank absorption fields do not function properly during rainy periods because of wetness and moderate permeability. Streets and roads should be designed to offset the limited ability of the Quitman soil to support a load. The risk of corrosion is high for uncoated steel and is moderate for concrete. Plans for homesite development should provide for the preservation of as many trees as possible. Plants that tolerate a seasonal high water table should be selected if drainage is not provided. Mulch, fertilizer, and irrigation are needed to establish lawn grasses and other shrubs and trees.

This map unit is not assigned to a capability subclass or woodland group.

BmF—Bodine-Minvale complex, 25 to 45 percent slopes. This map unit consists of deep, cherty, steep soils on long, narrow cherty limestone ridges. Bodine soils are somewhat excessively drained, and Minvale soils are well drained. Mapping these soils separately was not practical at the mapping scale selected.

Bodine soils make up about 50 percent of each mapped area. Typically, the surface layer is dark brown cherty silt loam about 5 inches thick. The subsoil is yellowish red very cherty to extremely cherty silty clay loam that extends to a depth of 72 inches or more.

Bodine soils are low in natural fertility and organic matter content. Reaction is strongly acid to very strongly acid. Permeability is moderately rapid, and available water capacity is low. The root zone is deep, but penetration is difficult in the lower part of the subsoil because of chert fragments (fig. 4).

Minvale soils make up about 35 percent of each mapped area. Typically, the surface layer is dark grayish brown cherty silt loam about 6 inches thick. The upper part of the subsoil is strong brown cherty silty clay loam that extends to a depth of 50 inches. The lower part is mottled red, yellow, brown, and gray cherty silty clay loam to a depth of 65 inches or more.

Minvale soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is moderate or high.

Included with this unit in mapping are areas of Dewey, Etowah, Fullerton, Quitman, and Townley soils. Also included are areas of limestone rock outcrops. Inclusions make up about 20 percent of the unit.

This unit is used mainly for woodland. It is also used for pasture and for urban development.

These soils have poor suitability for the production of loblolly pine. The main concern in producing and harvesting timber is slope. Conventional methods of harvest are difficult to use because of the steepness of slope. Management that minimizes the risk of erosion is essential in harvesting timber. Roads and landings can be protected from erosion by constructing diversions and by seeding disturbed areas. The low available water capacity of the Bodine soil generally influences seedling survival in areas where understory plants are numerous. Suitability for use as habitat for woodland wildlife is fair.

These soils are poorly suited to pasture and cultivated crops. The use of equipment is limited by chert fragments on the surface and by slope.

These soils are poorly suited to urban development. For septic tank absorption fields, the limitation of moderate permeability in the Minvale soil can be overcome by increasing the size of the absorption field. The steepness of the slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Access roads must be designed

Figure 4.—A roadcut in an area of Bodine soils exposes the chert fragments that hinder root penetration.

to control surface runoff and keep soil losses to a minimum.

These soils are in capability subclass VIIs. Bodine soils are in woodland group 3f, and Minvale soils are in woodland group 3o.

BrF—Brilliant very channery loam, 6 to 45 percent slopes. This is a deep, somewhat excessively drained, sloping to steep soil in areas where strip mining operations have uncovered and redeposited deep sediments of sandstone, siltstone, and shale. Slopes in older mine spoil areas are very complex, with short steep side slopes, high walls, and pits filled with water. More recent mine spoil areas have longer, smoother slopes with or without high walls and water-filled pits. Individual areas are long and narrow and follow ridges.

Typically, the surface layer is dark grayish brown very channery loam about 4 inches thick. The subsoil is dark grayish brown very channery silt loam that extends to a depth of 62 inches or more.

This soil is high to low in natural fertility. Nitrogen must be applied in large amounts. Other essential elements usually are available in amounts needed for plant growth. Organic matter content is very low. Reaction ranges from medium acid to mildly alkaline. This soil has fair tilth and can be worked throughout a wide range of moisture content. Crusting of the surface layer can be a problem where clayey soil material is placed back during reclamation. The root zone is deep but can be restricted by large rocks.

Included with this soil in mapping are soils that are similar to the Brilliant soil except that they are more acid throughout. Also included are small areas of soils adjacent to reclaimed areas. The included soils and areas of high walls make up about 10 percent of most areas.

This unit will eventually be used for woodland. Unreclaimed areas usually contain mixtures of annuals and perennials and scattered pine and hardwood. Reclaimed areas are planted to grasses and legumes to control erosion while pine trees are being established.

Suitability for growing loblolly pine is fair. The erosion hazard is severe when no vegetative cover is present. Conventional methods of harvesting trees can be used in the more gently sloping areas but are difficult to use in the steeper areas. Rocks on the surface may interfere with harvesting and planting operations. The low available water capacity generally influences seedling survival. Suitability for use as habitat for woodland wildlife is poor.

This soil is unsuited to pasture and cultivated crops. Suitability is limited because of excessive amounts of rock fragments, low available water capacity, and slope (fig. 5). Unreclaimed areas are further limited because of very steep and complex slopes. The hazard of erosion is very severe, especially when soil material is redeposited during reclamation.

This soil is poorly suited to urban development. The main limitations are slope, large stones, and unstable fill.

The Brilliant soil is in capability subclass VIIs and in woodland group 3x.

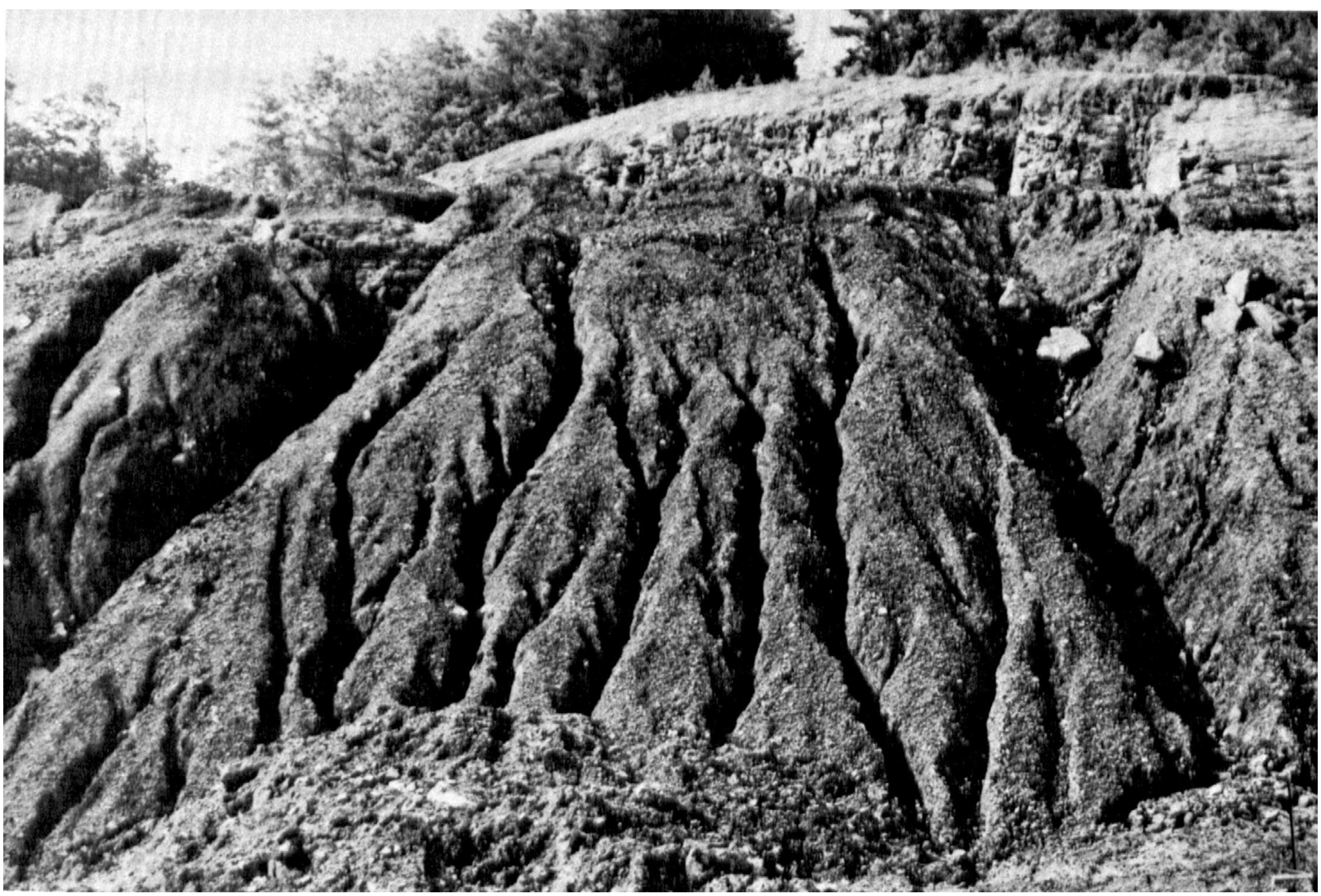


Figure 5.—An unreclaimed area of Brilliant very channery loam, 6 to 45 percent slopes. This soil is not suitable for pasture because of the rock fragments, steepness of slope, and drought stress due to the low available water capacity.

Ch—Choccolocco loam, occasionally flooded. This deep, well drained, nearly level soil is on natural levees and terraces of the major streams and their tributaries. It is flooded occasionally during winter and early spring. Slope ranges from 0 to 2 percent.

Typically, the surface layer is brown loam about 5 inches thick. The upper part of the subsoil is brownish yellow loam that extends to a depth of 11 inches over strong brown clay loam that extends to a depth of 22 inches. The lower part is yellowish brown loam to a depth of 47 inches. The underlying material is mottled gray, brown, and yellow loam to a depth of 65 inches.

This soil is medium in natural fertility and organic matter content. Reaction is medium acid or strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is moderate to high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are small areas of Allen, Etowah, Quitman, and Sterrett soils. Also included are soils adjacent to waterways, along small drainageways, and in depressional areas that are sandy throughout and soils with redder colors throughout. The included soils make up about 15 percent of the map unit.

This Choccolocco soil is used mainly for cultivated crops. It is also used for pasture and woodland.

This soil is well suited to cultivated crops. Flooding in the spring sometimes delays tillage. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion.

This soil is well suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil is well suited to the production of loblolly pine. Conventional methods of harvesting timber can be used, but their use may be limited during rainy periods. This soil is well suited to woodland wildlife habitat.

This soil is poorly suited to urban development. The main limitation is flooding. Overcoming this limitation is not economically practical.

The Choccolocco soil is in capability subclass IIw and in woodland group 3o.

CS—Choccolocco-Sterrett association, frequently flooded. This association consists of deep, nearly level, well drained and somewhat poorly drained soils that are on flood plains of streams and creeks. The well drained Choccolocco soils are close to the waterway and formed in coarser sediments, which are deposited first when the waterway overflows. The somewhat poorly drained Sterrett soils are farther from the waterway and formed in finer textured, more poorly drained sediments. There generally is a slight difference in elevation; the Choccolocco soils are several feet higher than the Sterrett soils. These soils are flooded frequently during winter and spring.

Choccolocco soils make up about 45 percent of each mapped area. Typically, the surface layer is brown loam about 5 inches thick. The upper part of the subsoil is brownish yellow loam that extends to a depth of 11 inches over strong brown clay loam that extends to a depth of 22 inches. The lower part of the subsoil is yellowish brown loam that extends to a depth of 47 inches. The underlying material is mottled gray, brown, and yellow loam to a depth of 65 inches.

Choccolocco soils are medium in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is moderate or high. These soils have good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Sterrett soils make up about 40 percent of each mapped area. Typically, the surface layer is grayish brown silt loam about 4 inches thick. The subsurface layer is very pale brown silt loam that extends to a depth of 8 inches. The upper part of the subsoil is mottled yellowish brown silt loam that extends to a depth of 14 inches. The next part is mottled gray, brown, and yellow clay loam to a depth of 58 inches. The lower part is mottled gray, brown, and yellow stratified clay loam and sandy clay loam.

Sterrett soils are medium in natural fertility and organic matter content. They are strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderately slow, and available water capacity is moderate. These soils have fair tilth and can be worked throughout a moderate range of moisture content. The root zone is deep and is easily penetrated by plant roots. The water table is within a few inches of the surface during winter and spring.

Included with these soils in mapping are small areas of Allen, Quitman, Townley, and Tupelo soils. Also included are soils that are similar to the Choccolocco soils except that they have a sandier subsoil. Included soils make up about 20 percent of each mapped area.

These soils are used mainly for woodland and pasture (fig. 6). Some areas are used for cultivated crops.

These soils are well suited to the production of loblolly pine. Conventional methods of harvesting timber can be used, but their use may be limited during rainy periods. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. These soils have good suitability for use as habitat for woodland wildlife.

These soils have fair suitability for hay and pasture and for cultivated crops. The main limitations are flooding and wetness. The use of equipment is restricted during the wet season.

Figure 6.—Improved pasture on Choccolocco-Sterrett association, frequently flooded.

The soils in this map unit are unsuited to urban development. The main limitations are frequent flooding, wetness, and moderately slow permeability. Overcoming these limitations is impractical.

Choccolocco soils are in capability subclass IIw and in woodland group 3o. Sterrett soils are in capability subclass IVw and in woodland group 2w.

DeB2—Dewey clay loam, 2 to 6 percent slopes, eroded. This deep, well drained, gently sloping soil is in valleys underlain by limestone.

Typically, the surface layer is yellowish red clay loam about 5 inches thick. The upper 7 inches of the subsoil is yellowish red silty clay, and the next 10 inches is yellowish red clay. From 22 to 48 inches, the subsoil is mottled, yellowish red clay. From 48 to 70 inches, it is mottled red and brown clay.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is high. This soil has fair tilth and can be worked thoughout a moderate range of moisture content. The root zone is deep, but plant roots penetrate it with difficulty because of the high clay content.

Included with this soil in mapping are small areas of Allen, Decatur, Etowah, Minvale, Quitman, and Tupelo soils. Included soils make up about 20 percent of the unit.

This soil is used mainly for hay and pasture. It is also used as cultivated cropland and woodland.

This soil is well suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

The soil has fair suitability for cultivated crops. It is limited mainly by poor tilth. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion.

Suitability for growing loblolly pine is good. This soil has few limitations for use and management. Because the Dewey soil is sticky when wet, most harvesting and planting equipment should be used during dry periods. Suitability for use as habitat for woodland wildlife is good.

This unit is poorly suited to urban development. Because of the moderate permeability of the soil, septic tank absorption fields can fail. Increasing the size of the absorption field may help to compensate for this limitation. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Dewey soil is in capability subclass IIIe and in woodland group 4c.

DeC2—Dewey clay loam, 6 to 10 percent slopes, eroded. This deep, well drained, sloping soil is in valleys underlain by limestone. Slope ranges from 6 to 10 percent.

Typically, the surface layer is yellowish red clay loam about 5 inches thick. The upper 7 inches of the subsoil is yellowish red silty clay, and the next 10 inches is yellowish red clay. From a depth of 22 inches to a depth of 48 inches, the subsoil is mottled, yellowish red clay. To 70 inches, it is mottled, red and brown clay.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate, and available water capacity is high. This soil has fair tilth and can be worked throughout a moderate range of moisture content. The root zone is deep, but plant roots penetrate it with difficulty because of the high clay content.

Included with this soil in mapping are a few small areas of Allen, Decatur, Etowah, Minvale, Quitman, and Tupelo soils. Included soils make up about 20 percent of most areas.

This Dewey soil is used mainly for pasture and hay. It is also used for woodland and for cultivated crops.

This soil is well suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil has poor suitability for cultivated crops. The hazard of erosion and poor tilth are limitations. Practices that can be used to control erosion include minimum tillage, contour farming, suitable cropping systems, terraces, diversions, and grassed waterways. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion.

This soil is well suited to the production of loblolly pine It has few limitations to woodland use and management. Because this soil is sticky when wet, most harvesting and planting equipment should be used during dry weather. Suitability for use as habitat for woodland wildlife is good.

This soil is poorly suited to urban development. Because of the moderate permeability of the soil, septic tank absorption fields can fail. Increasing the size of the absorption field may help to overcome this limitation. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Dewey soil is in capability subclass IVe and in woodland group 4c.

DtC—Dewey-Tupelo-Urban land complex, 0 to 8 percent slopes. This map unit consists of well drained, deep, gently sloping Dewey and Tupelo soils and Urban land in valleys underlain by limestone bedrock. The soils are flooded occasionally along major creeks. The areas of Dewey and Tupelo soils and of Urban land are so intermingled that it was not practical to map them separately.

Dewey clay loam makes up about 35 percent of each mapped area. Typically, the surface layer is yellowish red clay loam about 5 inches thick. The upper 7 inches of the subsoil is yellowish red silty clay, and the next 10 inches is yellowish red clay. From 22 to 48 inches, the subsoil is mottled yellowish red clay; and from 48 to 70 inches it is mottled red and brown clay.

The Dewey soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is slow, and available water capacity is medium.

Tupelo loam makes up about 25 percent of each mapped area. Typically, the surface layer is dark grayish brown loam about 5 inches thick. The upper part of the subsoil is light yellowish brown silty clay loam that extends to a depth of 12 inches. The next part is light olive brown clay mottled with grayish brown that extends to a depth of 26 inches. The next part is mottled light gray, olive yellow, and yellowish brown clay that extends to 38 inches. The underlying material is clay and extends to a depth of more than 60 inches. It is dark gray and dark grayish brown to 43 inches and is mottled gray, brown, and yellow below 43 inches.

The Tupelo soil is low in natural fertility and organic matter content. Reaction is medium acid to moderately alkaline. Permeability is slow, and available water capacity is high. The root zone is deep, but the clayey subsoil offers some resistance to penetration by plant roots.

Urban land makes up about 25 percent of each mapped area. It consists of areas that have been altered to the extent that soil classification is not practical. It includes areas covered by buildings, streets, sidewalks, and parking lots and areas that have been significantly disturbed by cutting, filling, or grading.

Included in mapping are small areas of Decatur, Etowah, and Quitman soils. Included soils make up about 15 percent of this map unit.

The soils in this map unit are poorly suited to urban development. Slow permeability and the high water table may cause septic tank absorption fields to fail. Providing drainage and increasing the size of the absorption field help to compensate for slow permeability. Roads and buildings should be located above the expected flood level. The effects of shrinking and swelling of the soil can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Streets and roads should be designed to offset the limited ability of the soils to support a load. Outcroppings of limestone interfere with excavations and with landscaping, especially in areas used for lawns. The hazard of corrosion is high for uncoated steel and is moderate for concrete. The possibility of sinkholes exists. This hazard should be investigated before construction takes place.

This map unit is not assigned to a capability subclass or woodland group.

DuB—Decatur silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is in valleys underlain by limestone.

Typically, the surface layer is dark reddish brown silt loam about 6 inches thick. The upper part of the subsoil is dark reddish brown clay that extends to a depth of 18 inches. The lower part is dark red clay to a depth of 70 inches.

This soil is medium in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is moderate or high. This soil has good tilth and can be worked throughout a moderate range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Allen, Dewey, Etowah, Fullerton, and Tupelo soils. Also included are soils similar to the Decatur soil except that they have less clay throughout. Included soils make up about 30 percent of most mapped areas.

This Decatur soil is used mainly for cultivated crops and hay and pasture. A few areas are used for woodland.

The Decatur soil is well suited to cultivated crops (fig. 7). It has few limitations. Erosion is a moderate hazard. Practices that can be used to control erosion include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil is well suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

The Decatur soil is well suited to the production of loblolly pine. It has few limitations for woodland use and management. Because this soil is sticky when wet, most harvesting and planting equipment should be used during dry weather. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for urban develoment. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Decatur soil is in capability subclass IIe and in woodland group 3o.

DuC—Decatur silt loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is in valleys underlain by limestone.

Typically, the surface layer is dark reddish brown silt loam about 6 inches thick. The upper part of the subsoil is dark reddish brown clay that extends to a depth of 18 inches. The lower part is dark red clay to a depth of 70 inches.

This soil is medium in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is moderate or high. This soil has good tilth and can be worked throughout a moderate range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are small areas of Allen, Dewey, Etowah, Fullerton, and Tupelo soils. Also included are areas of soils similar to the Decatur soil except that they have less clay throughout. Included soils make up about 30 percent of the total acreage.

This Decatur soil is used mainly for pasture and hay and for cultivated crops. It is also used for woodland.

This soil is well suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil has fair suitability for cultivated crops. It is limited mainly by slopes that commonly are short and complex and a surface layer that is shallow and easily eroded. Practices that can be used to control erosion include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil is well suited to the production of loblolly pine. There is no significant limitation for woodland use or management. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for urban development. The steepness of the slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Streets and roads should be designed to offset the limited ability of the soil to support a load.

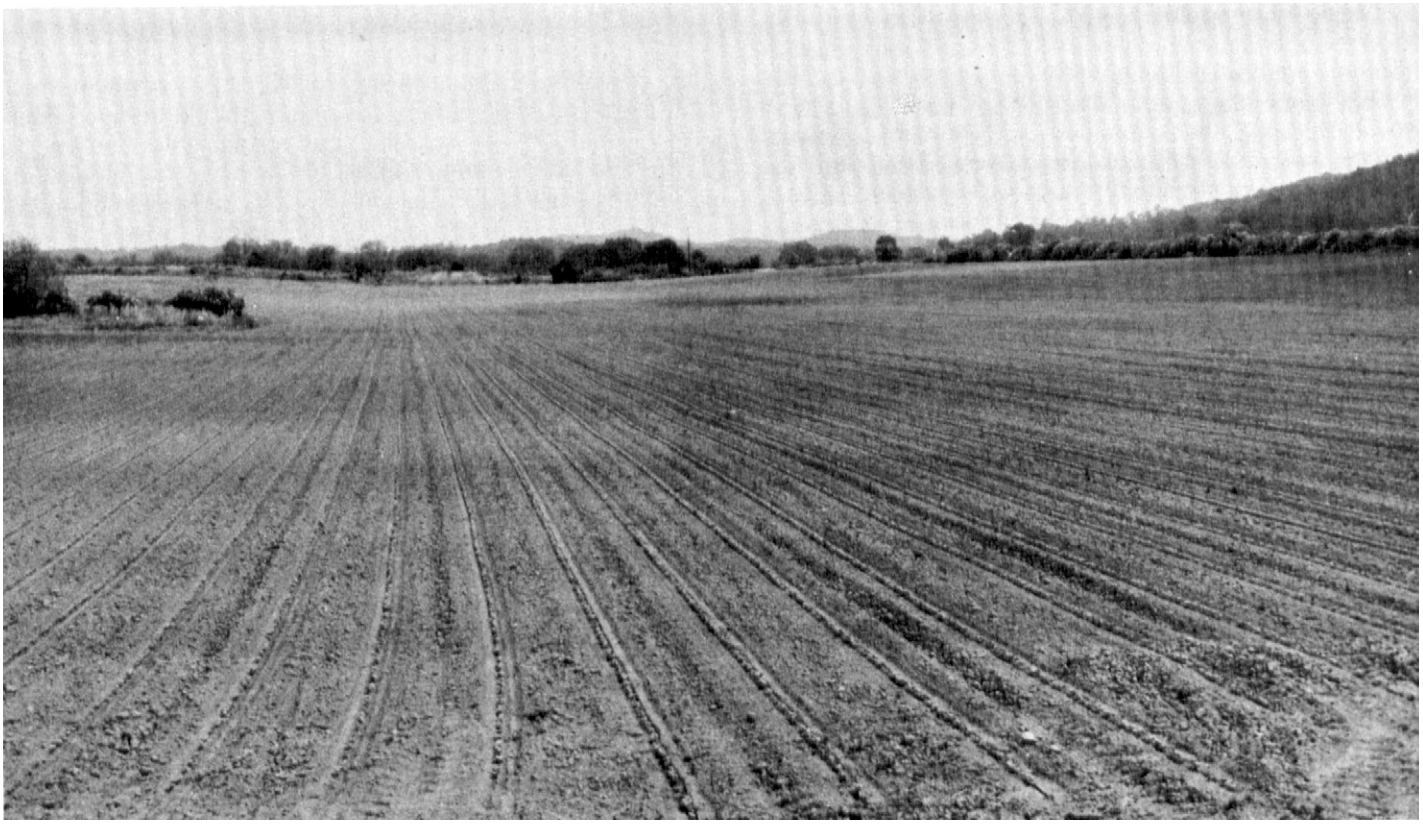


Figure 7.—Decatur silt loam, 2 to 6 percent slopes, is well suited to cultivated crops.

This Decatur soil is in capability subclass IIIe and in woodland group 3o.

DuD—Decatur silt loam, 10 to 15 percent slopes. This deep, well drained, strongly sloping soil is in valleys underlain by limestone.

Typically, the surface layer is dark reddish brown silt loam about 6 inches thick. The upper part of the subsoil is dark reddish brown clay that extends to a depth of 18 inches. The lower part is dark red clay to a depth of 70 inches.

This soil is medium in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is moderate or high. This soil has good tilth and can be worked throughout a moderate range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Allen, Dewey, Etowah, and Fullerton soils. Included soils make up about 35 percent of this map unit.

This Decatur soil is used for woodland and pasture.

This soil is well suited to the production of loblolly pine. There are no significant limitations for woodland use and management. Roads and landings can be protected from erosion by constructing diversions and by seeding disturbed areas. This soil has good suitability for use as habitat for woodland wildlife.

This soil is well suited to pasture and hay. The main limitation is slope. The use of equipment is limited by slope. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil has poor suitability for cultivated crops. The main limitation is slope. Practices that can be used to control erosion include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil has fair suitability for urban development. The steepness of the slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Streets and roads can be designed to offset the effects of low strength.

This Decatur soil is in capability subclass IVe and in woodland group 3o.

DuX—Decatur-Urban land complex, 2 to 10 percent slopes. This map unit consists of well drained, gently sloping to sloping Decatur soils and Urban land in the limestone valleys. The areas of the Decatur soils and of Urban land are so intermingled that it was not practical to map them separately at the scale used in mapping.

Decatur silt loam makes up about 55 percent of the map unit. Typically, the surface layer is dark reddish brown silt loam about 6 inches thick. The upper part of the subsoil is dark reddish brown clay that extends to a depth of 18 inches. The lower part is dark red clay to a depth of 70 inches.

Decatur soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is moderate or high. The root zone is deep and is easily penetrated by plant roots.

Urban land makes up about 30 percent of the map unit. It consists of areas covered by buildings, sidewalks, patios, driveways, parking lots, and streets and areas that have been significantly disturbed by cutting, filling, or grading. The areas have been so altered that classification of the soil is not practical.

Included in mapping are a few small areas of Allen, Dewey, Etowah, Fullerton, and Tupelo soils. Included soils make up about 15 percent of this map unit.

The Decatur soil has fair suitability for urban development. The main limitations to the use of this soil for urban development are low strength, shrink-swell potential, and slope. Streets and roads can be designed to offset the effects of low strength. The hazard of corrosion is high for uncoated steel and moderate for concrete.

This complex was not assigned to a capability subclass or to a woodland group.

EtB—Etowah silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on uplands and toe slopes in the limestone valleys.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The upper part of the subsoil is strong brown silt loam that extends to a depth of 12 inches. The lower part is yellowish red silty clay loam between depths of 12 and 37 inches and mottled, yellowish red silt loam between depths of 37 and 60 inches.

This soil is medium in natural fertility and organic matter content. It is strongly acid or very strongly acid unless the surface layer has been limed. Permeability is moderate, and available water capacity is high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are small areas of Bodine, Decatur, Fullerton, Minvale, Quitman, and Tupelo soils. Included soils make up about 25 percent of most mapped areas.

This Etowah soil is used mainly for pasture and hay production. It is also used for cultivated crops, woodland, and homesite development.

This soil is well suited to pasture and hay. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield (fig. 8).

This soil is well suited to cultivated crops. The suitability is limited by the small size and irregular shape of some of the areas and the slope of adjacent soils. Practices that can be used to control erosion include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil is well suited to loblolly pine. There are no significant limitations for woodland use and management. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for urban development. Moderate permeability and low strength are the main limitations. For septic tank absorption fields, the limitation of moderate permeability can generally be overcome by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Etowah soil is in capability subclass IIe and in woodland group 2o.

EtC—Etowah silt loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is on uplands and toe slopes in the limestone valleys.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The upper part of the subsoil is strong brown silt loam that extends to a depth of 12 inches. The lower part is yellowish red silty clay loam between depths of 12 and 37 inches and mottled, yellowish red silt loam between depths of 37 and 60 inches.

This soil is medium in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Bodine, Decatur, Fullerton, Minvale, Quitman, and Tupelo soils. Included soils make up about 20 percent of this unit.

This Etowah soil is used mainly for pasture. A few areas are used as woodland and cropland and for homesite development.

This soil is well suited to pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

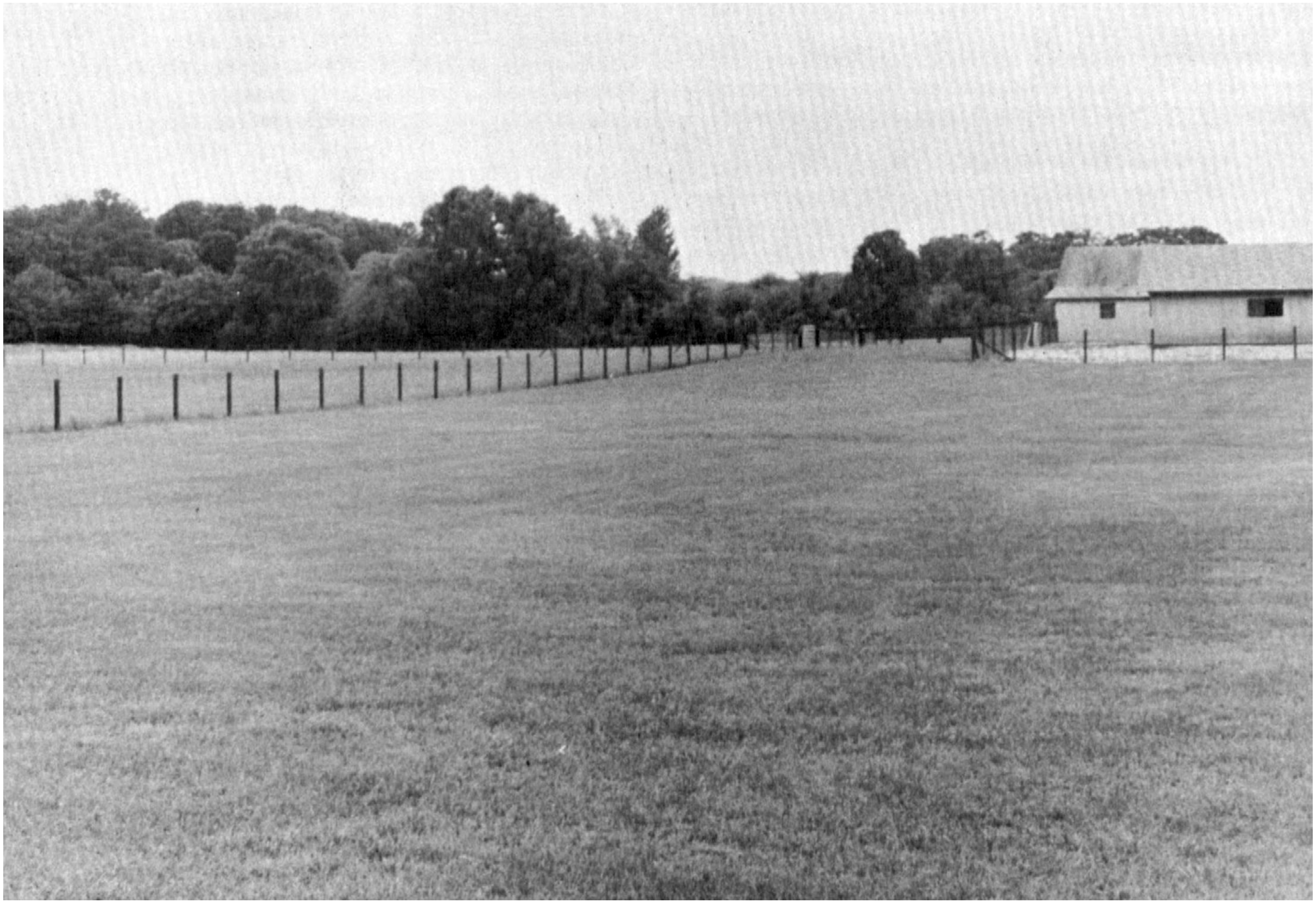


Figure 8.—Etowah silt loam, 2 to 6 percent slopes, is well suited to use as pasture.

This soil has fair suitability for cultivated crops. The suitability is limited by slope and by the small size and irregular shape of the areas. Practices that can be used to control erosion include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil is well suited to loblolly pine. There are no significant limitations for woodland use and management. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for urban development. Moderate permeability, low strength, and slope are the main limitations. For septic tank absorption fields, the limitation of moderate permeability can usually be overcome by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Etowah soil is in capability subclass IIIe and in woodland group 2o.

GrD—Gorgas-Rock outcrop complex, 6 to 15 percent slopes. This map unit consists of well drained, strongly sloping, shallow Gorgas soils and Rock outcrop on the upper side slopes of sandstone ridges and mountains. The areas of the Gorgas soils and Rock outcrop are so intermingled that it was not practical to separate them at the scale used in mapping.

Gorgas soils make up about 45 percent of each mapped area. Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsoil is yellowish brown sandy loam to a depth of 14 inches. The underlying material is hard, massive sandstone.

Gorgas soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid. Permeability is moderately rapid, and available water capacity is very low. The root zone is shallow and is easily penetrated by plant roots.

Rock outcrop makes up about 35 percent of each mapped area. Rock outcrop consists of exposed hard sandstone bedrock that ranges from about 10 square feet to an acre.

Included with this complex in mapping are a few areas of Hanceville and Nauvoo soils and a soil that is similar to the Gorgas soils except that it is more than 20 inches deep to bedrock. Included soils make up about 20 percent of the map unit.

The soils in this unit are used mainly for woodland. A few areas are used for pasture and for homesite development.

The soils in this unit have fair suitability for the production of loblolly pine. The Rock outcrop on the surface can interfere with the operation of equipment. Trees are subject to windthrow because of limited rooting depth. These soils have poor suitability for use as habitat for woodland wildlife.

The soils in this unit are poorly suited to pasture and hay crops and cultivated crops. The use of equipment is limited by Rock outcrop and by lack of soil moisture during most growing seasons.

The soils in this unit are poorly suited to homesite development. The main limitations for homesite development are the shallowness to bedrock, the rocky surface, and the hazard of seepage. Any excavations needed during construction may expose bedrock. Effluent from septic tank absorption fields can surface in downslope areas and create a hazard to health.

This complex is in capability subclass VIe and in woodland group 4d.

GvC—Greenville loam, 2 to 10 percent slopes. This deep, well drained, gently sloping soil is on Coastal Plain uplands.

Typically, the surface layer is reddish brown loam about 5 inches thick. The subsoil is dark red sandy clay that extends to a depth of 60 inches or more.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Quitman and Smithdale soils. Also included are soils that are less than 60 inches thick. Included soils make up about 20 percent of most mapped areas.

This Greenville soil is used mostly for pasture and hay production. It is also used for cultivated crops and woodland.

This soil is well suited to pasture and hay. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil is well suited to cultivated crops. The main limitations are slope and the hazard of erosion. Practices that can be used to control erosion include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways. Tilth and fertility can be improved by returning crop residue to the soil.

This soil is well suited to the production of loblolly pine. It has few limitations for use and management. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for homesite and urban development. The main limitations are moderate permeability, low strength, and slope. For septic tank absorption fields, the limitation of moderate permeability can generally be overcome by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Greenville soil is in capability subclass IIIe and in woodland group 3o.

HvD—Hanceville loam, 6 to 15 percent slopes. This deep, well drained, strongly sloping soil is on the upper part of side slopes and ridgetops. It formed in residuum of sandstone.

Typically, the surface layer is dark reddish brown loam about 7 inches thick. The upper part of the subsoil is dark reddish brown clay that extends to a depth of 37 inches. The lower part is dark red clay that extends to a depth of 70 inches or more.

Hanceville soils are low in natural fertility and organic matter content. They are strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of soils that are similar to the Hanceville soil except that they have less clay throughout. Also included are a few small areas of Gorgas and Nauvoo soils and rock outcrops near the boundaries of the mapped areas. Inclusions make up about 25 percent of this map unit.

This Hanceville soil is used mainly for pasture and hay. It is also used for woodland and homesite development.

This soil is well suited to pasture and hay. The use of equipment is limited by slope. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil is poorly suited to most cultivated crops. The main limitations are slope and the hazard of erosion. Practices that can be used on the lower part of slopes to control erosion include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways. Tilth and fertility can be improved by returning crop residue to the soil.

This soil is well suited to the production of loblolly pine. Logging roads can be protected from erosion by constructing diversions and by seeding disturbed areas. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for homesite development. The main limitations are slope, shrink-swell potential, and low strength. Streets and roads should be designed to offset the limited ability of the soil to support a load. The effects of shrinking and swelling can be minimized by using proper engineering designs.

This Hanceville soil is in capability subclass IVe and in woodland group 4o.

MfD—Minvale-Fullerton complex, 6 to 15 percent slopes. This map unit consists of well drained, deep, strongly sloping Minvale and Fullerton soils on uplands. These soils formed in residuum of cherty limestone. The areas of Minvale and Fullerton soils are so intermingled that it was not practical to map them separately at the scale used in mapping.

Minvale soils make up about 45 percent of each mapped area. Typically, the surface layer is dark grayish brown cherty silt loam about 6 inches thick. The upper part of the subsoil is strong brown cherty silty clay loam that extends to a depth of 50 inches. The lower part is mottled red, yellow, brown, and gray cherty silty clay loam that extends to a depth of 65 inches or more.

Minvale soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability and available water capacity are moderate.

Fullerton soils make up about 30 percent of each mapped area. Typically, the surface layer is very dark grayish brown cherty loam about 6 inches thick. The upper part of the subsoil is reddish yellow cherty silty clay loam that extends to a depth of 12 inches. The lower part is mottled yellowish red cherty silty clay that extends to a depth of 63 inches or more.

Fullerton soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability and available water capacity are moderate.

Included with these soils in mapping are a few areas of Bodine, Decatur, Etowah, Quitman, and Tupelo soils. Included soils make up about 25 percent of the unit.

These Minvale and Fullerton soils are used mainly for woodland. They are also used for pasture and hay production and for homesite development.

These soils are well suited to the production of loblolly pine. There are few limitations for woodland use and management. Large chert fragments on the surface can interfere with the operation of equipment. The Minvale soils and the Fullerton soils are well suited to use as habitat for upland woodland wildlife.

These soils are well suited to hay and pasture (fig. 9). There are no significant limitations in most areas. Forage cutting can be affected by chert fragments on the surface. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

These soils are poorly suited to cultivated crops. They are limited mainly by short complex slopes, which make terraces impractical to build. The erosion hazard, slope, and chert fragments on the surface make cultivated row cropping difficult. Such practices as contour farming, minimum tillage, use of cover crops, returning crop residue to the soil, and use of grassed waterways, help control erosion.

These soils have fair suitability for homesite and urban development. Population growth has resulted in increased construction of homes on the unit. The main limitations are moderate permeability, slope, clay content, shrink-swell potential, and low strength. For septic tank absorption fields, the limitation of moderate permeability can generally be overcome by increasing the size of the absorption field. Buildings should be designed to offset the shrinking and swelling of the Fullerton soils. Roads should be designed to offset the limited ability of the soils to support a load. The possibility of sinkholes exists. This hazard should be investigated before construction takes place.

Plans for homesite development should provide for the preservation of as many trees as possible. Establishing and maintaining plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes. Removal of chert fragments from the surface or application of chert-free topsoil to disturbed areas is required for best results when landscaping, particularly in areas used for lawns. In summer, irrigation is required for lawn grasses, shrubs, shade trees, and ornamental plants.

These soils are in capability subclass IVe and in woodland group 3o.

MfE—Minvale-Fullerton complex, 15 to 35 percent slopes. This map unit consists of well drained, deep, moderately steep to steep Minvale and Fullerton soils on uplands. These soils formed in residuum of cherty limestone. The areas of Minvale and Fullerton soils are so intermingled that it was not practical to map them separately at the scale used in mapping.

Minvale soils make up about 50 percent of each mapped area. Typically, the surface layer is dark grayish brown cherty silt loam about 6 inches thick. The upper part of the subsoil is strong brown silty clay loam that extends to a depth of 50 inches. The lower part is mottled red, yellow, brown, and gray silty clay loam that extends to a depth of 65 inches or more.

Minvale soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability and available water capacity are moderate.

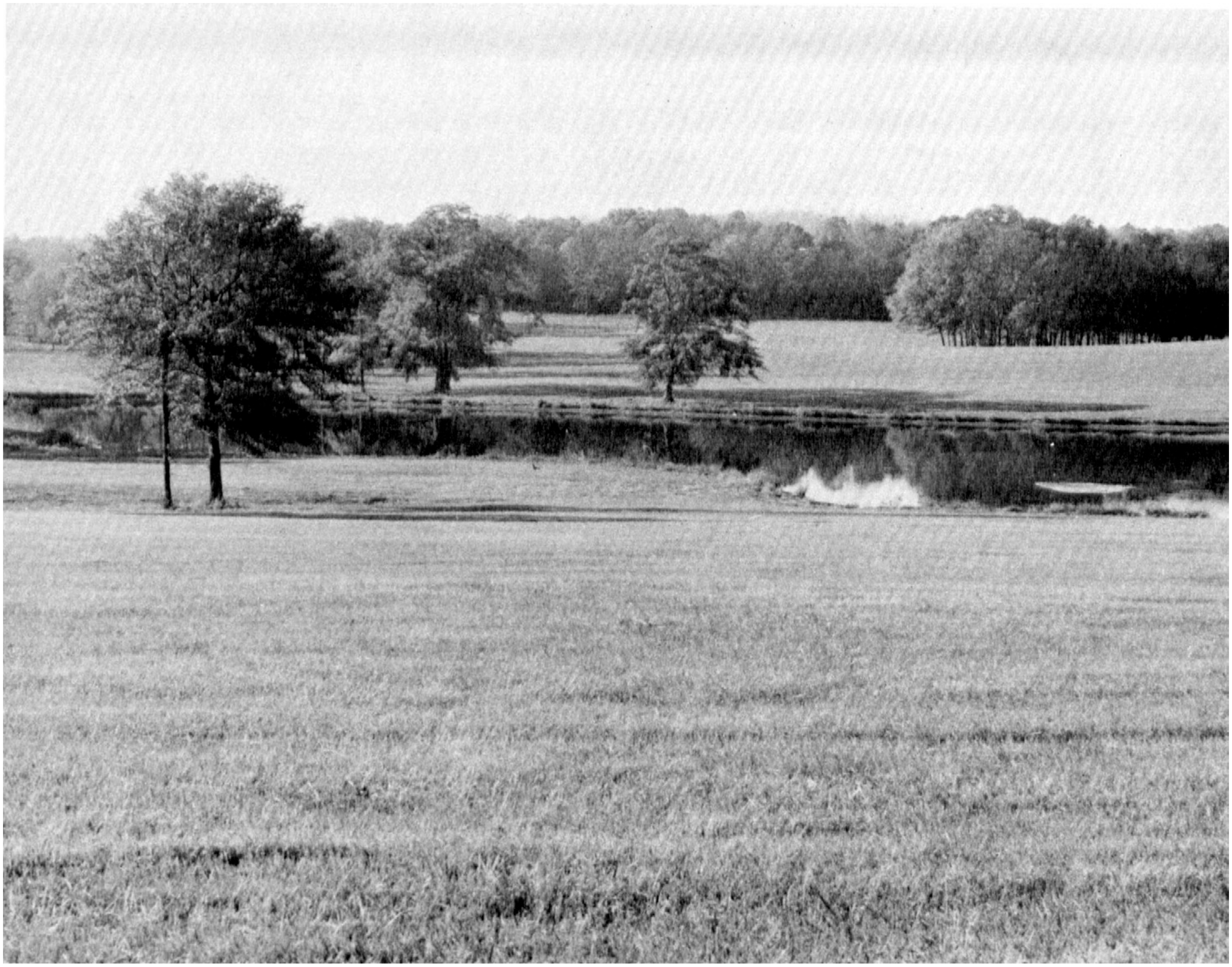


Figure 9.—Improved pasture on Minvale-Fullerton complex, 6 to 15 percent slopes.

Fullerton soils make up about 35 percent of each mapped area. Typically, the surface layer is very dark grayish brown cherty loam about 6 inches thick. The upper part of the subsoil is reddish yellow cherty silty clay loam that extends to a depth of 12 inches. The lower part is mottled yellowish red cherty silty clay that extends to a depth of 63 inches or more.

Fullerton soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability and available water capacity are moderate.

Included with these soils in mapping are a few areas of Bodine, Decatur, Etowah, Quitman, and Tupelo soils. Included soils make up about 15 percent of the map unit.

These Minvale and Fullerton soils are used mainly for woodland. They are also used for homesite development and some pasture.

These soils have fair suitability for the production of loblolly pine. Conventional harvesting methods are difficult to use because of the steepness of slope. Large chert fragments on the surface can interfere with the operation of equipment. Proper design of road drainage systems and care in the placement of culverts help to control erosion. Roads can be protected from erosion by constructing diversions and by seeding disturbed areas. These soils are well suited to use as habitat for upland or woodland wildlife.

These soils have poor suitability for pasture and row crops. The main limitations are the steep, abrupt slopes and large chert fragments on the surface.

These soils are poorly suited to homesite and urban development. Population growth has resulted in increased construction of homes. The main limitation is slope. Erosion is a hazard in the steeper areas. Only the part of a site that is used for construction should be disturbed. The steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and to help stabilize cut slopes.

Also of concern on these soils are moderate permeability, shrink-swell potential, and low strength. For septic tank absorption fields, the limitation of moderate permeability can generally be overcome by increasing the size of the absorption field. Buildings and roads can be designed to offset the effects of shrinking and swelling of the Fullerton soils. Roads should be designed to offset the limited ability of the soils to support a load. The possibility of sinkholes exists. This hazard should be investigated before construction takes place.

Plans for homesite development should provide for the preservation of as many trees as possible. Establishing and maintaining plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes. Removal of chert fragments from the surface or application of chert-free topsoil to disturbed areas is required for best results when landscaping particularly in areas used for lawns. In summer, irrigation is required for lawn grasses, shrubs, shade trees, and ornamental plants.

These soils are in capability subclass VIIe and in woodland group 3r.

MuE—Minvale-Fullerton-Urban land complex, 6 to 25 percent slopes. This map unit consists of well drained, deep, sloping to moderately steep Minvale and Fullerton soils and Urban land on uplands. The soils in this map unit formed in residuum of cherty limestone. The areas of Minvale and Fullerton soils and Urban land are so intermingled that it was not practical to map them separately at the scale used in mapping.

Minvale cherty silt loam makes up about 35 percent of each mapped area. Typically, the surface layer is dark grayish brown cherty silt loam about 6 inches thick. The upper part of the subsoil is strong brown silty clay loam that extends to a depth of 50 inches. The lower part is mottled red, yellow, brown, and gray silty clay loam that extends to a depth of 65 inches or more.

Minvale soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability and available water capacity are moderate. The root zone is deep and is easily penetrated by plant roots.

Fullerton cherty loam makes up about 30 percent of each mapped area. Typically, the surface layer is very dark grayish brown cherty loam about 6 inches thick. The upper part of the subsoil is reddish yellow cherty silty clay loam that extends to a depth of 12 inches. The lower part is mottled yellowish red cherty silty clay that extends to a depth of 63 inches or more.

Fullerton soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability and available water capacity are moderate. The root zone is deep, but chert fragments and a clayey subsoil make penetration difficult.

Urban land makes up about 25 percent of each mapped area. It consists of areas that have been alerted to the extent that soil classification is not practical. It includes areas covered by buildings, garages, streets, sidewalks, and parking lots and areas that have been significantly disturbed by cutting, filling, or grading.

Included in mapping are small areas of Bodine, Decatur, Etowah, Quitman, and Tupelo soils. Included soils make up about 10 percent of each mapped area.

The soils in this map unit are poorly suited to homesite and urban development. The main limitation is slope. Erosion is a hazard in the steeper areas. Only the part of a site that is used for construction should be disturbed. The steepness of the slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and to help stabilize cut slopes.

Also of concern on the soils are moderate permeability, shrink-swell potential, and low strength. For septic tank absorption fields, the limitation of moderate permeability can usually be overcome by increasing the size of the absorption field. Buildings and roads can be designed to offset the effects of shrinking and swelling of the Fullerton soils. Roads should be designed to offset the limited ability of these soils to support a load. The hazard of corrosion is moderate to high for uncoated steel and low to moderate for concrete. The possibility of sinkholes exist. This hazard should be investigated before construction takes place.

Plans for homesite development should provide for the preservation of as many trees as possible. Establishing and maintaining plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes. Removal of chert fragments on the surface or applications of chert-free topsoil to disturbed areas is required for best results when landscaping, particularly in areas used for lawns. In summer, irrigation is required for lawn grasses, shrubs, shade trees, and ornamental plants.

This unit is not assigned to a capability subclass or woodland group.

NaC—Nauvoo loam, 2 to 8 percent slopes. This moderately deep, well drained, gently sloping soil is on side slopes and ridgetops of uplands. It formed in residuum of tilted sandstone or interbedded sandstone and siltstone.

Typically, the surface layer is dark brown loam about 2 inches thick. The subsurface layer is yellowish brown fine sandy loam that extends to a depth of 5 inches. The upper part of the subsoil is yellowish red clay loam that extends to a depth of 10 inches. The lower part is mottled red clay loam that extends to a depth of 40 inches. The underlying material is mottled brownish yellow sandy clay loam about 8 inches thick over soft, rippable sandstone.

This soil is low in natural fertility and organic matter content. Unless the surface has been limed, reaction ranges from strongly acid to very strongly acid. Permeability and available water capacity are moderate. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Hanceville, Sunlight, and Townley soils. Also included are soils that are similar to the Nauvoo soil except that they are less than 30 inches thick over soft sandstone bedrock. Included soils make up about 30 percent of most mapped areas.

Most areas of this Nauvoo soil are used for pasture and woodland. A few areas are used for homesite development.

This soil is well suited to pasture and hay production. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil is well suited to cultivated crops. The main limitations are slope and erodibility. Erosion can be controlled by the use of terraces, diversions, grassed waterways, minimum tillage, contour farming, and suitable cropping systems. Tilth and fertility can be improved by returning crop residue to the soil.

This soil is well suited to the production of loblolly pine. It has few limitations for woodland use and management. Roads can be protected from erosion by constructing diversions and seeding disturbed areas. Suitability for use as habitat for woodland wildlife is good.

This soil has fair suitability for homesite development. The main limitations are depth to rock, moderate permeability, and low strength. Any excavations needed during construction may expose bedrock. For septic tank absorption fields, the limitation of moderate permeability can generally be overcome by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Nauvoo soil is in capability subclass IIIe and in woodland group 2o.

NaD—Nauvoo loam, 8 to 15 percent slopes. This moderately deep, well drained, strongly sloping soil is on side slopes and ridgetops of the uplands. It formed in residuum of tilted sandstone or interbedded sandstone and siltstone.

Typically, the surface layer is dark brown loam about 2 inches thick. The subsurface layer is yellowish brown fine sandy loam that extends to a depth of 5 inches. The upper part of the subsoil is yellowish red clay loam that extends to a depth of 10 inches. The lower part is mottled red clay loam that extends to a depth of 40 inches. The underlying mterial is mottled brownish yellow sandy clay loam about 8 inches thick over soft, rippable sandstone.

This soil is low in natural fertility and organic matter content. Unless the surface layer has been limed, reaction ranges from strongly acid to very strongly acid. Permeability and available water capacity are moderate. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Hanceville, Sunlight, and Townley soils. Also included are soils similar to Nauvoo soil except that they are less than 30 inches deep to soft sandstone bedrock. Included soils make up about 35 percent of most mapped areas.

Most areas of this Nauvoo soil are used for woodland and pasture. A few areas are used for homesite development.

This soil is well suited to the production of loblolly pine. It has few limitations for woodland use and management. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Roads can be protected from erosion by constructing diversions and seeding disturbed areas. This soil has good suitability for use as habitat for woodland wildlife.

This soil is well suited to pasture and hay. The use of equipment is limited by slope. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil is poorly suited to most cultivated crops. It is limited mainly by slope and erodibility. On the lower part of slopes, erosion can be controlled by the use of terraces, diversions, grassed waterways, minimum tillage, contour farming, and suitable cropping systems. Tilth and fertility can be improved by returning crop residue to the soil.

This soil has fair suitability for homesite development. The main limitations are depth to rock, slope, and low strength. Most excavations needed in construction may expose bedrock. Absorption lines should be installed on the contour. Streets and roads should by designed to offset the limited ability of the soil to support a load.

This Nauvoo soil is in capability subclass IVe and in woodland group 2o.

NaE—Nauvoo loam, 15 to 35 percent slopes. This moderately deep, well drained, moderately steep to steep soil is on narrow ridgetops and steep side slopes of the uplands. It formed in residuum of tilted sandstone or interbedded sandstone and siltstone.

Typically, the surface layer is dark brown loam about 2 inches thick. The subsurface layer is yellowish brown fine sandy loam that extends to a depth of 5 inches. The upper part of the subsoil is yellowish red clay loam that extends to a depth of 10 inches. The lower part is mottled red clay loam that extends to a depth of 40 inches. The underlying material is mottled brownish yellow sandy clay loam about 8 inches thick over soft, rippable sandstone.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability and available water capacity are moderate. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of a soil that is similar to the Nauvoo soil except that it is more than 60 inches deep to soft sandstone bedrock. In a few areas there is a similar soil that is less than 30 inches deep to soft sandstone bedrock. Also included are small areas of Gorgas, Hanceville, Sunlight, and Townley soils. Included soils make up about 30 percent of this map unit.

This Nauvoo soil is used mainly for woodland. A few areas are used for homesite development.

This soil has fair suitability for the production of loblolly pine. The steepness of slope limits the kind of equipment that can be used in forest management. Proper design of road drainage systems and care in the placement of culverts help to control erosion. Disturbed areas can be protected from erosion by diversions and by seeding to grass. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. This soil has fair or good suitability for use as habitat for woodland wildlife.

This soil is not suited to pasture and cultivated crops. The main limitations are the slope and scattered outcroppings of sandstone.

This soil is poorly suited to homesite development. The main limitations are slope and depth to rock. Only the part of a site that is used for construction should be disturbed. The steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Access roads must be designed to control surface runoff. Any excavations needed during construction may expose bedrock.

This Nauvoo soil is in capability subclass VIIe and in woodland group 2r.

NcD—Nauvoo-Sunlight complex, 8 to 15 percent slopes. This map unit consists of moderately deep and shallow, strongly sloping, well drained soils that formed in residuum of sandstone and siltstone. These soils are predominantly in the northwestern and central parts of the county on a series of narrow ridges. The areas of Nauvoo and Sunlight soils are so intermingled that it was not practical to map them separately at the scale used in mapping.

Nauvoo soils make up about 65 percent of each mapped area. Typically, the surface layer is dark brown loam about 2 inches thick. The subsurface layer is yellowish brown fine sandy loam that extends to a depth of 5 inches. The upper part of the subsoil is yellowish red clay loam that extends to a depth of 10 inches. The lower part is mottled red clay loam that extends to a depth of 40 inches. The underlying material is mottled brownish yellow sandy clay loam about 8 inches thick over soft, rippable sandstone.

Nauvoo soils are low in natural fertility and organic matter content. Reaction is medium acid to very strongly acid. Permeability and available water capacity are moderate.

Sunlight soils make up about 15 percent of each mapped area. Typically, the surface layer is very dark grayish brown channery silt loam about 2 inches thick. The subsoil is yellowish brown channery silt loam that extends to a depth of 5 inches. The lower part is yellowish brown extremely channery silty clay loam that extends to a depth of 12 inches. The underlying material is shaly siltstone.

Sunlight soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid. Permeability is moderate, and available water capacity is low.

Included with these soils in mapping are a few areas of Gorgas, Quitman, and Townley soils. Also included are soils similar to the Nauvoo soils except that they are less than 30 inches deep to soft, weathered sandstone. Included soils make up about 20 percent of the unit.

These Nauvoo and Sunlight soils are used mainly for woodland and pasture. A few areas are used for homesite development.

The soils in this unit are well suited to the production of loblolly pine. These soils have few limitations for woodland use and management. Roads can be protected from erosion by constructing diversions and seeding disturbed areas. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The low available water capacity of the Sunlight soils generally influence seedling survival in areas where understory plants are numerous. Trees are subject to windthrow on the Sunlight soils because of limited rooting depth. The soils in this map unit have fair suitability for use as habitat for woodland wildlife.

These soils are well suited to pasture and hay. The use of equipment is limited because of slope. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

The suitability of these soils for most cultivated crops is poor, mainly because of slope and erodibility. Practices that can be used to control erosion in the less sloping areas include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways. Tilth and fertility can be improved by returning crop residue to the soil.

These soils have fair suitability for urban development. The main limitations are depth to rock, slope, moderate permeability, and low strength. Any excavations needed during construction may expose bedrock. This bedrock is generally rippable to a depth of several feet. For septic tank absorption fields, the limitation of moderate permeability can generally be overcome by increasing the size of the absorption field. Absorption lines should be installed on the contour. Streets and roads should be designed to offset the limited ability of these soils to support a load.

This complex is in capability subclass IVe. The Nauvoo soils are in woodland group 2o, and the Sunlight soils are in woodland group 4d.

NcE—Nauvoo-Sunlight complex, 15 to 25 percent slopes. This map unit consists of moderately deep and shallow, moderately steep, well drained soils that formed in residuum of sandstone and siltstone. These soils are predominantly in the northwestern and central parts of the county on a series of narrow ridges. The areas of the Nauvoo and Sunlight soils are so intermingled that it was not practical to map them separately at the scale used in mapping.

Nauvoo soils and closely similar soils make up about 60 percent of each mapped area. Typically, the surface layer is dark brown loam about 2 inches thick. The subsurface layer is yellowish brown sandy loam that extends to a depth of 5 inches. The upper part of the subsoil is yellowish red clay loam that extends to a depth of 10 inches. The lower part is mottled red clay loam that extends to a depth of 40 inches. The underlying material is mottled brownish yellow sandy clay loam about 8 inches thick over soft, rippable sandstone.

Nauvoo soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability and available water capacity are moderate.

Sunlight soils make up about 30 percent of each mapped area. Typically, the surface layer is very dark grayish brown channery silt loam about 2 inches thick. The upper part of the subsoil is yellowish brown channery silt loam that extends to a depth of 5 inches. The lower part is very channery silty clay loam that extends to a depth of 12 inches. The underlying material is shaly siltstone.

Sunlight soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is low.

Included with this unit in mapping are a few small areas of soils that have soft sandstone bedrock at a depth of less than 30 inches. Also included are small areas of Quitman and Townley soils and small areas of exposed sandstone bedrock. The inclusions make up about 10 percent of the unit.

These Nauvoo and Sunlight soils are used mainly for woodland (fig. 10). They are also used for pasture and for homesite and urban development.

The soils in this unit have fair suitability for the production of loblolly pine. They have few limitations for woodland use and management. The steepness of the slope limits the kind of equipment that can be used in forest management. Trees are subject to windthrow because of the limited rooting depth of the Sunlight soils. The low available water capacity of the Sunlight soils generally influences seedling survival in areas where understory plants are numerous. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Proper design of road drainage systems and care in the placement of culverts help to control erosion. Disturbed areas can be protected from erosion by diversions and by seeding to grass. These soils have fair suitability for use as habitat for woodland wildlife.

The soils in this unit are poorly suited to pasture and hay. The use of equipment is limited by the slope and the scattered rock outcrops. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality yield.

These soils have poor suitability for cultivated crops. Slope and the hazard of erosion along with scattered outcroppings of sandstone are severe limitations.

These soils are poorly suited to homesite and urban development. Population growth has resulted in increased construction of homes on these soils. The main limitations are slope, depth to rock, moderate permeability, and low strength. Any excavations needed during construction may expose bedrock. This bedrock is generally rippable to a depth of several feet. For septic tank absorption fields, the limitation of moderate permeability can usually be overcome by increasing the size of the absorption field. Absorption lines should be installed on the contour. Streets and roads should be designed to offset the limited ability of these soils to support a load.

Roads should be designed to control surface runoff and keep soil losses to a minimum. Topsoil can be stockpiled and used to reclaim areas disturbed by cutting and filling. Only the part of a site that is used for construction should be disturbed. Preserving the existing plant cover during construction helps to control erosion.

Figure 10.—Mixed hardwood and pine woodland on Nauvoo-Sunlight complex, 15 to 25 percent slopes.

It is difficult to establish plants in areas that have had the surface layer removed. Mulching, fertilizing, and liming in disturbed areas help to establish plants.

This complex is in capability subclass VIe. The Nauvoo soils are in woodland group 2r, and the Sunlight soils are in woodland group 4d.

NMS—Nella-Mountainburg association, steep. This map unit consists of soils that formed in residuum and colluvium on sandstone mountains. Nella soils are on side slopes and toe slopes. They formed in colluvium. Mountainburg soils are on upper side slopes and mountaintops. They formed in residuum. Slopes range from 15 to 50 percent.

The deep Nella soils make up about 50 percent of each mapped area. Typically, the surface layer is brown cobbly sandy loam about 5 inches thick. The upper part of the subsoil is yellowish red cobbly sandy clay loam that extends to a depth of 18 inches. The lower part is mottled yellowish red cobbly sandy clay loam to a depth of 70 inches.

Nella soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid. Permeability and available water capacity are moderate.

The shallow Mountainburg soils make up about 20 percent of each mapped area. Typically, the surface layer is very dark grayish brown gravelly sandy loam about 3 inches thick. The subsoil is yellowish brown very stony sandy loam that extends to a depth of 15 inches. The underlying material is tilted fractured sandstone.

Mountainburg soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid. Permeability is moderately rapid, and available water capacity is low.

Included with these soils in mapping are areas of Gorgas, Hanceville, Nauvoo, and Townley soils. Included soils make up about 30 percent of this map unit.

The soils in this unit are used mainly for woodland and for recreation developments. They are also used for homesites.

These soils have fair suitability for the production of loblolly pine and hardwoods. The main concerns in producing and harvesting timber are slope, sandstone rock outcrops, and erosion hazard. Conventional methods of harvesting trees can be used in the more gently sloping areas but are difficult to use in the steeper areas. The low available water capacity of the Mountainburg soils generally influences seedling survival in areas where understory plants are numerous. Proper design of road drainage systems and care in the placement of culverts help to control erosion. Spoil areas can be protected from erosion by constructing diversions and by seeding disturbed areas. These soils have poor suitability for use as habitat for woodland wildlife.

These soils are unsuited to cultivated crops and pasture because of steep slopes and rocks.

These soils are poorly suited to recreational development. Steep slopes limit the use of areas of this unit mainly to a few paths and trails, which should extend across the slope. Rock outcrop and boulders of various sizes are common throughout the unit. These hazards should be avoided in constructing paths and trails. Cuts and fills should be seeded and mulched. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining adequate plant cover.

These soils are poorly suited to use as sites for urban development. If these soils are used as homesites, the main limitations are slope and the shallowness over rock of the Mountainburg soils. Areas of included soils that may be suitable for homesites should be individually investigated. The steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Any excavations needed during construction may expose bedrock. Access roads should be designed to control surface runoff and to help stabilize cut slopes. Plans for homesite development should provide for the preservation of as many trees as possible. Stones and cobbles must be removed in disturbed areas for best results when landscaping, particularly in areas used for lawns. In summer, irrigation is required for lawn grasses, shrubs, and ornamental or shade trees on the Mountainburg soils.

These soils are in capability subclass VIe. The Nella soils are in woodland group 3x, and the Mountainburg soils are in woodland group 4d.

PmF—Pirum fine sandy loam, 25 to 60 percent slopes. This moderately deep, well drained, steep soil is on steep side slopes. It formed in residuum of sandstone.

Typically, the surface layer is dark brown fine sandy loam about 5 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam that extends to a depth of 20 inches. The lower part is yellowish brown very gravelly loam that extends to a depth of 28 inches. The underlying material is brown and yellow sandstone conglomerate.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is low. The root zone is moderately deep, but penetration by plant roots is difficult.

Included with this soil in mapping are a few small areas of Nauvoo and Sunlight soils. Also included are areas of rock outcrops and rock bluff. Inclusions make up about 20 percent of this unit.

This Pirum soil is used for woodland, mainly hardwood and pine. It is poorly suited to the production of loblolly pine. The steepness of the slope limits the kinds of equipment that can be used in forest management. Management that minimizes the risk of erosion is essential in harvesting timber. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. This soil has fair suitability for use as habitat for woodland wildlife.

This soil is not suited to cultivated crops and pasture because of the steepness of the slope.

This soil is poorly suited to urban development. Any excavations needed during construction may expose bedrock. Erosion is a hazard, and only that part of a site that is used for construction should be disturbed. The steepness of the slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and to help stabilize cut slopes.

This Pirum soil is in capability subclass VIIe and in woodland group 3r.

Pt—Pits. Pits consists of areas where the soil and underlying material have been removed for use at another location. In the areas there are gravel pits, chert pits, and limestone quarries and spoil piles near the pits. The areas range from 5 to several hundred feet in depth, and some hold water. The floor and walls of most pits are exposed geologic strata.

The areas are mostly bare, and erosion is a severe hazard. The low available water capacity and low natural fertility make revegetation difficult. The areas around most of the pits are covered with soil and geologic material and refuse from the pits. The material includes low-grade or impure ore and rocks larger than several feet in diameter. Many of the areas are partly covered with young pine and cedar.

This miscellaneous area was not assigned to a capability subclass or a woodland group.

QuB—Quitman loam, 0 to 4 percent slopes. This deep, moderately well drained, nearly level to gently sloping soil is on stream terraces and toe slopes and along drainageways. It formed in medium to fine textured alluvium.

Typically, the surface layer is yellowish brown loam about 6 inches thick. The upper part of the subsoil is mottled, olive yellow loam that extends to a depth of 35 inches. The lower part is mottled light yellowish brown, yellowish brown, and light gray loam to a depth of 70 inches.

This soil is medium in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are small areas of Allen, Choccolocco, Etowah, Fullerton, Minvale, Sterrett, Townley, and Tupelo soils and soils similar to the Quitman soil except that they have large amounts of chert fragments. Also included, adjacent to depressional areas and along drainageways, are soils that have slopes of more than 4 percent. Included soils make up about 20 percent of the map unit.

This Quitman soil is used for woodland. It is also used for pasture, urban development, and cultivated crops.

This soil is well suited to the production of loblolly pine. The main concern in woodland use and management is wetness. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December to March. This soil has good suitability for use as habitat for woodland wildlife.

This soil is well suited to hay and pasture. It has few limitations. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer is needed for optimum growth of grasses and legumes.

This soil has fair suitability for cultivated crops. The perched water table that develops during winter generally limits the use of equipment to prepare the soil for planting in spring.

This soil is poorly suited to urban uses. The main limitations are wetness, slow permeability, and low strength. Because a seasonal high water table is present during winter, drainage should be provided. Septic tank absorption fields do not function properly during rainy periods because of the wetness and moderate permeability of the soil. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Quitman soil is in capability subclass IIe and in woodland group 2w.

SmC—Smithdale sandy loam, 5 to 8 percent slopes. This deep, well drained, gently sloping soil is on ridgetops and side slopes of the Coastal Plain uplands.

Typically, the surface layer is brown sandy loam about 5 inches thick. The upper part of the subsoil is red sandy clay loam that extends to a depth of 17 inches. The lower part is mottled red sandy clay loam that extends to a depth of 60 inches.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is moderate or high. This soil has good tilth and can be worked throughout a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are small areas of soils that are similar to the Smithdale soil except that they are yellower or have a clayey subsoil. Also included are small areas of Greenville and Quitman soils. Included areas make up about 20 percent of this unit.

This Smithdale soil is used mainly for woodland and pasture. A few areas are used for cropland and for homesite development.

This soil is well suited to the production of loblolly pine. It has few limitations for woodland use and management. If site preparation is not adequate, competition from undesirable plants can prevent or hinder natural or artificial reestablishment of trees. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. This soil has good suitability for use as habitat for woodland wildlife.

This soil is well suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil is well suited to cultivated crops. Practices that can be used to control erosion include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil is well suited to urban development. The main limitation is slope. The hazard of erosion is increased if the soil is left exposed during site development. All disturbed areas should be revegetated as soon as possible.

This Smithdale soil is in capability subclass IIIe and in woodland group 3o.

SmD—Smithdale sandy loam, 8 to 15 percent slopes. This deep, well drained, strongly sloping soil is on ridgetops and side slopes of the Coastal Plain uplands.

Typically, the surface layer is brown sandy loam about 5 inches thick. The upper part of the subsoil is red sandy clay loam that extends to a depth of 17 inches. The lower part is mottled red sandy clay loam that extends to a depth of 60 inches.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is moderate or high. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are small areas of soils that are similar to the Smithdale soil except that they are yellower or have a clayey subsoil. Also included are small areas of Greenville and Quitman soils. Included areas make up about 20 percent of the total acreage of this unit.

This Smithdale soil is used mainly for woodland. A few areas are used for pasture and for homesite development.

This soil is well suited to the production of loblolly pine. It has few limitations for woodland use and management. If site preparation is not adequate, competition from undesirable plants can prevent or hinder natural or artificial reestablishment of trees. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for hay and pasture. The use of equipment can be limited by slope. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil is poorly suited to cultivated crops. It is limited mainly by slope. Practices that can be used to control erosion in the less sloping areas include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil has fair suitability for urban development. The main limitation is slope. The hazard of erosion is increased if the soil is left exposed during site development. All disturbed areas should be revegetated as soon as possible.

This Smithdale soil is in capability subclass IVe and in woodland group 3o.

St—Sterrett silt loam. This deep, somewhat poorly drained, nearly level soil is on low stream terraces and broad upland flats along drainageways. This soil is ponded or flooded occasionally for brief periods during winter and early spring. Slope ranges from 0 to 2 percent.

Typically, the surface layer is grayish brown silt loam about 4 inches thick. The subsurface layer is very pale brown silt loam that extends to a depth of 8 inches. The upper part of the subsoil is mottled yellowish brown silt loam that extends to a depth of 14 inches. The middle part is mottled gray, brown, and yellow clay loam that extends to a depth of 58 inches. The lower part to a depth of 74 inches is mottled gray, brown, and yellow stratified sandy clay loam and sandy loam.

This soil is medium in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is slow, and available water capacity is moderate. This soil has fair tilth and can be worked throughout a moderate range of moisture content. The root zone is deep and is easily penetrated by plant roots. The water table is within a few inches of the surface during winter and spring.

Included with this soil in mapping are a few small areas of Choccolocco, Quitman, and Townley soils. Included soils make up about 20 percent of this map unit.

This Sterrett soil is used mainly for woodland. It is also used for pasture and hay.

This soil is well suited to the production of hardwood trees. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, which are generally from December to March. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for hay and pasture. Wetness limits the choice of plants to grasses, such as fescue. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer is needed for optimum growth of grasses and legumes.

This soil has fair suitability for cultivated crops. Most adapted crops can be grown if artificial drainage is provided. Drainage is used to lower the water table if a suitable outlet is available. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion.

This soil is poorly suited to urban development. The main limitations are wetness, slow permeability, and flooding. Overcoming these limitations is not economically feasible.

This Sterrett soil is in capability subclass IIIw and in woodland group 2w.

TaD—Tatum silt loam, 4 to 12 percent slopes. This deep, well drained, sloping soil is on ridgetops and side slopes of the uplands.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil is red clay that becomes mottled in the lower part and extends to a depth of 45 inches. The underlying material is massive, weathered phyllite.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability and available water capacity are moderate. This soil has fair tilth and can be worked throughout a medium range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Quitman and Weogufka soils. Also included are soils similar to the Tatum soil except that they are more than 60 inches deep and are darker red throughout. Included soils make up about 15 percent of this unit.

This Tatum soil is used mainly for woodland. It is also used for pasture and homesite development.

This soil is well suited to the production of loblolly pine. It has few limitations for woodland use and management. Roads and landings can be protected from erosion by constructing diversions and by seeding disturbed areas. This soil has good suitability for use as habitat for woodland wildlife.

This soil is well suited to hay and pasture. It has few limitations. The use of equipment is limited by slope. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil has fair suitability for cultivated crops. Practices that can be used to control erosion in less sloping areas include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil has fair suitability for urban development. The main limitations are moderate permeability, depth to rock, low strength, and slope. For septic tank absorption fields, the limitation of moderate permeability can usually be overcome by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of the soil to support a load. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed.

This Tatum soil is in capability subclass IIIe and in woodland group 4o.

ToD—Townley silt loam, 4 to 12 percent slopes. This moderately deep, well drained, gently sloping to sloping soil is on uplands. It formed in residuum of tilted shale and siltstone.

Typically, the surface layer is yellowish brown silt loam about 5 inches thick. The subsoil is strong brown silt loam that extends to a depth of 10 inches. The lower part is mottled, yellowish red clay to a depth of 30 inches. The underlying material is mottled, brownish yellow silty clay that is 10 inches thick over tilted, weathered shale and siltstone.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is slow, and available water capacity is moderate. This soil has fair tilth and can be worked throughout a medium range of moisture content. The root zone is deep, but the clayey subsoil offers some resistance to penetration by plant roots.

Included with this soil in mapping are a few small areas of Nauvoo, Quitman, Sterrett, and Sunlight soils. Also included are small areas of soils that are similar to the Townley soil except that they are more than 35 inches thick. Included soils make up about 20 percent of the total mapped area.

This Townley soil is used mainly for woodland. It is also used for pasture, cropland, and urban development.

This soil is well suited to the production of loblolly pine. It has few limitations for woodland use and management. Reforestation, after harvesting, must be carefully managed to reduce competition from undesirable understory plants. Because the clayey soil is sticky when wet, most planting and harvesting equipment should be used during dry periods. This soil has good suitability for use as habitat for woodland wildlife.

This soil is well suited to hay and pasture. It has few limitations. The use of equipment might be limited in the more sloping areas. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil has fair suitability for cultivated crops. It is limited mainly by slope and clay content. Practices that can be used to control erosion in the less sloping areas include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil is poorly suited to urban development. The main limitations are depth to rock, slow permeability, and low strength. Many septic tank absorption fields do not function properly because of the slow permeability of the soil. This limitation can be overcome in some places by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of the soil to support a load. The hazard of erosion is increased if the soil is left exposed during site development.

This Townley soil is in capability subclass IVe and in woodland group 4c.

ToE—Townley silt loam, 12 to 18 percent slopes. This moderately deep, well drained, moderately steep soil is on uplands. It formed in residuum of shale and siltstone.

Typically, the surface layer is yellowish brown silt loam about 5 inches thick. The subsoil is strong brown silt loam that extends to a depth of 10 inches. The lower part is mottled, yellowish red clay that extends to a depth of 30 inches. The underlying material is mottled, brownish yellow silty clay that is 10 inches thick over tilted, weathered shale and siltstone.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid. Permeability is slow, and available water capacity is moderate. The root zone is deep, but penetration is difficult in the clayey subsoil.

Included with this soil in mapping are a few small areas of Nauvoo, Quitman, Sterrett, and Sunlight soils. Also included are small areas of soils that are similar to the Townley soil except that they are more than 35 inches thick. Inclusions make up about 25 percent of this map unit.

Most areas of this Townley soil are used for woodland. A few areas are used for pasture.

This soil is well suited to the production of loblolly pine. The main concern in producing and harvesting timber is slope. Roads and landings can be protected from erosion by constructing diversions and by seeding disturbed areas. Conventional methods of harvesting trees can be used in the more gently sloping areas but are difficult to use in the steeper areas. Reforestation, after harvesting, must be carefully managed to reduce competition from undesirable plants. Because the clayey soil is sticky when wet, most planting and harvesting equipment should be used during dry periods. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for hay and pasture. The use of equipment can be limited in the more sloping areas. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

This soil is poorly suited to cultivated crops. It is limited mainly by slope. Practices that can be used to control erosion in the less sloping areas include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

This soil is poorly suited to urban development. The main limitations are slope, depth to rock, slow permeability, and low strength. The steepness of the slope is a concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour. Many septic tank absorption fields cannot function properly because of the slow permeability of the soil. This limitation can be overcome in some places by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of this soil to support a load. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed.

This Townley soil is in capability subclass VIe and in woodland group 4r.

TsE—Townley-Sunlight complex, 12 to 35 percent slopes. This map unit consists of well drained and moderately deep and shallow Townley and Sunlight soils on uplands. These moderately steep to steep soils formed in residuum of shale and siltstone. The areas of Townley and Sunlight soils are so intermingled that it is not practical to separate them at the scale used in mapping.

Townley soils make up about 50 percent of each mapped area. Typically, the surface layer is yellowish brown silt loam about 5 inches thick. The subsoil is strong brown silt loam that extends to a depth of 10 inches. The lower part is mottled, yellowish red clay that extends to a depth of 30 inches. The underlying material is mottled, brownish yellow silty clay that is 10 inches thick over tilted, weathered shale and siltstone.

Townley soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is slow, and available water capacity is moderate. The root zone is deep, but the clayey subsoil offers some resistance to penetration by plant roots.

Sunlight soils make up about 30 percent of each mapped area. Typically, the surface layer is dark grayish brown channery silt loam about 2 inches thick. The subsoil is yellowish brown channery silt loam that extends to a depth of 5 inches. The lower part is extremely channery silty clay loam that extends to a depth of 12 inches. The underlying material is shaly siltstone.

Sunlight soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is low.

Included with these soils in mapping are small areas of Nauvoo, Quitman, and Sterrett soils and rock outcrops. The included soils and areas of rock outcrops make up about 20 percent of the map unit.

Most areas of Townley and Sunlight soils are used for woodland. A few areas are used for pasture.

These soils are well suited to the production of loblolly pine. The main concern in producing and harvesting timber is slope. Conventional methods of harvesting trees can be used in the more gently sloping areas but are difficult to use in the steeper areas. Roads and landings can be protected from erosion by constructing diversions and by seeding disturbed areas. Because the clayey part of Townley soils is sticky when wet, most planting and harvesting equipment should be used during dry periods. Trees are subject to windthrow on the Sunlight soil because of limited rooting depth. Reforestation, after harvesting, must be carefully managed to reduce competition from undesirable plants. These soils have good suitability for use as habitat for woodland wildlife.

The Townley soils and the Sunlight soils are poorly suited to pasture and cultivated crops. The use of equipment is limited by slope.

These soils are poorly suited to urban development. The steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. In many places, septic tank absorption fields cannot function properly because of the slow permeability of the soil. This limitation can be overcome in some places by increasing the size of the absorption field. Any excavations made for construction will expose shale and siltstone bedrock. Streets and roads should be designed to offset the limited ability of the Townley soil to support a load. Erosion is a hazard; therefore, only the part of a site that is used for construction should be disturbed.

These soils are in capability subclass VIe. The Townley soils are in woodland group 4r, and the Sunlight soils are in woodland group 4d.

TtE—Townley-Urban land complex, 4 to 25 percent slopes. This map unit is on uplands. It consists of well drained, moderately deep, gently sloping to moderately steep Townley soil and Urban land. The areas of Townley soil and the areas of Urban land are so intermingled that it was not practical to map them separately at the scale used in mapping. Townley soil formed in residuum of shale and siltstone.

Townley silt loam makes up about 45 percent of each mapped area. Typically, the surface layer is yellowish brown silt loam about 5 inches thick. The upper part of the subsoil is strong brown silt loam that extends to a depth of 10 inches. The lower part is mottled yellowish red clay that extends to a depth of 30 inches. The underlying material is mottled brownish yellow silty clay that is 10 inches thick over tilted, weathered shale and siltstone.

The Townley soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is slow, and available water capacity is moderate. The root zone is deep, but penetration is difficult in the clayey subsoil.

Urban land makes up about 30 percent of each mapped area. It consists of areas that have been altered to the extent that soil classification is not practical. It includes areas covered by buildings, garages, sidewalks, patios, driveways, parking lots, and streets and areas that have been significantly disturbed by cutting, filling, or grading.

Included in mapping are small areas of Nauvoo, Quitman, Sterrett, and Sunlight soils. Included soils make up about 25 percent of this map unit.

The Townley soil is poorly suited to homesite and urban development. Slope is a concern in the steeper areas if septic tank absorption fields are installed.

Absorption lines should be installed on the contour. Erosion is a hazard in the steeper areas. Access roads should be designed to control surface runoff and to help stabilize cut slopes. Only the part of a site that is used for construction should be disturbed.

Many septic tank absorption fields do not function properly because of slow permeability. This limitation can sometimes be overcome by increasing the size of the absorption field. Any excavations made for construction can expose shale and siltstone bedrock. Streets and roads should be designed to offset the limited ability of the Townley soil to support a load and to offset the effects of shrinking and swelling. The hazard of corrosion is moderate for uncoated steel and high for concrete.

Plans for homesite development should provide for the preservation of as many trees as possible. Removal of sandstone fragments on the surface or application of topsoil to disturbed areas is required for best results when landscaping, particularly in areas used for lawns. Establishing and maintaining plant cover can be achieved through proper fertilization, seeding, mulching, and shaping of the slope.

The soil in this map unit is not assigned to a capability subclass or to a woodland group.

Tu—Tupelo loam, frequently flooded. This deep, somewhat poorly drained, nearly level soil is along drainageways and in low depressional areas in valleys underlain by limestone. This soil is flooded during winter and early spring. Slope ranges from 0 to 3 percent.

Typically, the surface layer is dark grayish brown loam about 5 inches thick. The upper part of the subsoil is mottled light yellowish brown clay that extends to a depth of 12 inches. The lower part is mottled gray, yellow, and brown clay that extends to a depth of 76 inches or more.

This soil is medium in natural fertility and organic matter content. It is medium acid to moderately alkaline except for the surface layer in limed areas. Permeability is slow, and available water capacity is high. This soil has poor tilth and is worked with difficulty. The root zone is deep, but plant roots penetrate with difficulty.

Included with this soil in mapping are small areas of Allen, Dewey, and Quitman soils. Also included are soils that are similar to the Tupelo soil except that they are moderately well drained or poorly drained. Limestone rock outcrops are also common in some mapped areas. Also included are soils with slopes of more than 3 percent adjacent to depressional areas and waterways. Included areas make up about 20 percent of the map unit.

Most areas of this Tupelo soil are used as woodland and pasture. A few small areas are used as cropland.

This soil has fair suitability for the production of loblolly pine. If site preparation is not adequate, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Because the clayey part of the soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Disturbed areas can be protected from erosion by seeding to grass. This soil has good suitability for use as habitat for woodland wildlife.

This soil has fair suitability for pasture and hay. Wetness limits the choice of plants to grasses, such as fescue. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer is needed for optimum growth of grasses.

This soil has poor suitability for cultivated crops. The high water table that develops during winter and early spring generally delays tillage operations in spring. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion.

This soil is unsuited to use as sites for urban development. The main limitations are slow permeability, wetness, flooding, shrink-swell potential, and low strength. Overcoming these limitations is not usually economically feasible.

This Tupelo soil is in capability subclass IIIw and woodland group 3w.

TWS—Tatum-Weogufka association, steep. This association consists of well drained soils on uplands. These soils formed in residuum of phyllite and slate. The Tatum soils are on ridgetops and the upper part of side slopes and on benches and toe slopes. The Weogufka soils are on the middle and lower parts of side slopes. Slope ranges from 12 to 25 percent.

The deep Tatum soils make up about 55 percent of each mapped area. Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil is red clay that is mottled in the lower part and extends to a depth of 45 inches. The underlying material is massive, weathered phyllite.

Tatum soils are low in natural fertility and organic matter content. Unless the surface layer has been limed, reaction ranges from strongly acid to very strongly acid. Permeability and available water capacity are moderate. The root zone is deep and is easily penetrated by plant roots.

The shallow Weogufka soils make up about 35 percent of each mapped area. Typically, the surface layer is dark yellowish brown very channery sandy loam about 4 inches thick. The subsoil is reddish brown channery silty clay loam to a depth of 10 inches. Below this, to a depth of 28 inches, is partly weathered slate that has pockets of reddish brown loam along fracture planes. The underlying material is fractured slate.

Weogufka soils are low in natural fertility and organic matter content. Reaction is medium acid to very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is very low. The root zone is shallow, and penetration by plant roots is difficult.

Included with these soils in mapping are small areas of Quitman soils. Also included are areas of rock outcrops and soils similar to the Tatum soils except that they are deeper and are darker red throughout. Inclusions make up about 10 percent of this map unit.

The Tatum and Weogufka soils are used mainly for woodland. They are also used for pasture.

These soils have fair suitability for the production of loblolly pine. Management that minimizes the risk of erosion is essential in harvesting and revegetating timber. Roads and landings can be protected from erosion by constructing diversions and by seeding disturbed areas. Conventional methods of harvesting trees can be used in the more gently sloping areas but are difficult to use in the steeper areas. The very low available water capacity of the Weogufka soils generally influences seedling survival in areas where understory plants are numerous. Trees are subject to windthrow because of the limited rooting depth. These soils have fair suitability for use as habitat for woodland wildlife.

These soils have fair suitability for hay and pasture. The use of equipment is limited by slope. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yield.

These soils are poorly suited to cultivated crops. They are limited mainly by slope. Practices that can be used to control erosion in the less sloping areas include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways.

These soils are poorly suited to urban development. The main limitations are slope, depth to rock, moderate permeability, and low strength. The steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. The limitation of moderate permeability can usually be overcome by increasing the size of the absorption field. Streets and roads should be designed to offset the limited ability of the Tatum soils to support a load.

The Tatum soils are in capability subclass VIe and in woodland group 4r. The Weogufka soils are in capability subclass VIIe and in woodland group 4d.

Tx—Tupelo-Dewey complex. This map unit consists of deep, somewhat poorly drained to well drained, nearly level to gently sloping Tupelo and Dewey soils in valleys underlain by limestone bedrock. These soils are subject to flooding along creeks. The areas of Tupelo and Dewey soils are so intermingled that it was not practical to map them separately at the scale used in mapping. Slope ranges from 0 to 6 percent.

Tupelo soils make up about 40 percent of each mapped area. Typically, the surface layer is dark grayish brown loam about 5 inches thick. The upper part of the subsoil is mottled light yellowish brown clay that extends to a depth of 12 inches. The lower part is mottled gray, yellow, and brown clay that extends to a depth of 76 inches or more.

Tupelo soils are medium in natural fertility and organic matter content. They are medium acid to moderately alkaline. Permeability is slow, and available water capacity is high.

Dewey soils make up about 35 percent of each mapped area. Typically, the surface layer is yellowish red clay loam about 5 inches thick. The upper 7 inches of the subsoil is yellowish red silty clay, and the next 10 inches is yellowish red clay. From a depth of 22 inches to a depth of 48 inches, the subsoil is mottled yellowish red clay. Below that, to 70 inches or more, it is mottled red and brown clay.

Dewey soils are low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is slow, and available water capacity is high.

Included with these soils in mapping are small areas of limestone rock outcrops and areas of Allen, Choccolocco, Decatur, Etowah, and Quitman soils. Also included are soils similar to the Tupelo soils except that they are poorly drained. The included soils and the areas of rock outcrops make up about 25 percent of this map unit.

The Tupelo and Dewey soils are used mainly for woodland. They are also used for pasture.

These soils have fair suitability for the production of loblolly pine. Because the clay in these soils is sticky when wet, most planting and harvesting equipment can be used only during dry periods. If site preparation is not adequate, competition from undersirable plants can prevent or prolong natural or artificial reestablishment of trees. Inclusions of Rock outcrop on the surface can interfere with the use of harvesting and planting equipment. These soils have good suitability for use as habitat for woodland wildlife.

These soils have fair suitability for hay and pasture. Wetness of the Tupelo soils limits the choice of plants to grasses, such as fescue. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer is needed for optimum growth of grasses and legumes. The use of equipment may be restricted by the rock outcrops.

These soils are not suited to cultivated crops. Rock outcrops severely limit the use of tillage equipment. The high water table that develops during winter and early spring generally delays tillage in spring.

These Tupelo and Dewey soils are poorly suited to urban development. Slow permeability and the high water table of the Tupelo soils may cause septic tank absorption fields to fail. Because of a seasonal high water table that occurs in areas of Tupelo soils from December through April, drainage should be provided. Roads and streets should be located above the expected flood level that occurs on the Tupelo soils. Shrink-swell potential limits the use of Tupelo and Dewey soils as sites for buildings. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Streets and roads should be designed to offset the limited ability of these soils to support a load.

These soils are in capability subclass IIIw. The Tupelo soils are in woodland group 3w, and the Dewey soils are in woodland group 4c.

WgE—Weogufka very channery sandy loam, 15 to 35 percent slopes. This shallow, well drained, hilly to steep soil is on uplands. It formed in residuum of phyllite and slate.

Typically, the surface layer is dark yellowish brown very channery sandy loam about 4 inches thick. The subsoil is reddish brown extremely channery loam that extends to a depth of 10 inches. Below this, to a depth of 28 inches, is partly weathered slate that has pockets of reddish brown loam along fracture planes. The underlying material is fractured slate.

This soil is low in natural fertility and organic matter content. Reaction is medium acid to very strongly acid. Permeability is moderate, and available water capacity is very low. The root zone is shallow, and penetration by plant roots is difficult.

Included with this soil in mapping are small areas of Quitman and Tatum soils. Also included are soils similar to the Weogufka soil except that they are more than 60 inches deep and are darker red. Included soils make up about 25 percent of the total acreage.

Most areas of this Weogufka soil are used for woodland. A few areas are used for pasture and for homesite development, especially those areas next to Lay Lake.

This soil has fair suitability for the production of loblolly pine. Conventional methods of harvesting can be used in the less sloping areas but are difficult to use in the steeper areas. Trees are subject to windthrow because of limited rooting depth. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Roads and landings can be protected from erosion by constructing diversions and by seeding disturbed areas. This soil has fair suitability for use as habitat for woodland wildlife.

This soil is poorly suited to pasture and to cultivated crops. The use of equipment is limited by stones on the surface and by slope. Practices that can be used to control erosion in the less sloping areas include minimum tillage, contour farming, using suitable cropping systems, and constructing terraces, diversions, and grassed waterways. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage.

This soil is poorly suited to homesite development. Any excavations needed to develop sites may expose bedrock. The steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and to stabilize cut slopes.

This Weogufka soil is in capability subclass VIIe and in woodland group 4d.

WgF—Weogufka very channery sandy loam, 35 to 60 percent slopes. This shallow, well drained, steep soil is on uplands. It formed in residuum of phyllite and slate.

Typically, the surface layer is dark yellowish brown very channery sandy loam about 4 inches thick. The subsoil is reddish brown extremely channery loam to a depth of 10 inches. Below this, to a depth of 28 inches, is partially weathered slate that has pockets of reddish brown loam along fracture planes. The underlying material is fractured slate.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is very low. The root zone is shallow, and penetration by plant roots is difficult.

Included with this soil in mapping are small areas of Quitman and Tatum soils. Also included are areas of rock outcrops or rock escarpment on steep side slopes. Included areas make up about 25 percent of the total acreage.

This Weogufka soil is used mainly for woodland.

This soil is poorly suited to the production of loblolly pine. The steepness of slope limits the kinds of equipment that can be used in forest management. Management that minimizes the risk of erosion is essential in harvesting timber. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous. Trees are subject to windthrow because of limited rooting depth. This soil has fair suitability for use as habitat for woodland wildlife.

This soil is not suited to pasture and cultivated crops. Slope is the main limitation.

This soil is poorly suited to homesite development. Any excavations needed to develop sites may expose bedrock. The steepness of slope is a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and to stabilize cut slopes.

This Weogufka soil is in capability subclass VIIe and in woodland group 4d.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited. The U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that is best suited to producing food, feed, forage, fiber, and oilseed crops. This land has the quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops if it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

This land included areas that are currently used for crops, pasture, woodland, or other purposes, but not urban and built-up land or water areas. The land must either be used for producing food or fiber or be available for these uses.

Prime farmland generally has an adequate and dependable supply of moisture from precipitation or irrigation. It also has a favorable temperature and growing season and an acceptable level of acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible, is not saturated with water for long periods, and is not flooded during the growing season. Slope ranges mainly from 0 to 6 percent. For more detailed information regarding the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

In Shelby County, prime farmland soils make up about 47,940 acres, or about 9 percent of the survey area. Areas of these soils are scattered throughout the county, mainly in the limestone valleys and on terraces of the Cahaba and Coosa Rivers and their tributaries. Most of the prime farmland is in general soil map units 6, 7, and 9.

A recent trend in land use in some parts of the county is the loss of some prime farmland to industrial and urban uses. This loss results in more intensive use of marginal lands, which generally are more erodible, droughty, difficult to cultivate, and generally less productive.

The detailed map units, or soils, that make up prime farmland in Shelby County are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this survey. The soil properties that affect use and management are described in the section "Detailed Soil Map Units."

The map units listed below meet the requirements for prime farmland, unless the soils are urban or built-up land. Urban or built-up land is any contiguous unit of land of 10 acres or more that is used for residences, industrial sites, commercial sites, construction sites, institutional sites, public administration sites, railroad yards, small parks, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures and spillways, or shooting ranges.

AnB Allen loam, 2 to 6 percent slopes
Ch Choccolocco loam, occasionally flooded
DeB2 Dewey clay loam, 2 to 6 percent slopes, eroded
DuB Decatur silt loam, 2 to 6 percent slopes
EtB Etowah silt loam, 2 to 6 percent slopes
QuB Quitman loam, 0 to 4 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Robert F. Berry, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the Shelby County Office of the Soil Conservation Service or the Cooperative Extension Service.

The acreage planted to cultivated crops has been increasing in recent years, and the acreage used as pastureland has decreased. The acreage of urban land is increasing as the metropolitan areas of adjoining Jefferson County expand into Shelby County.

There was approximately 47,000 acres of cropland in Shelby County in 1974 (*16*). In 1974, crops were produced on 18,000 acres, or 38 percent of the total cropland. In 1979, approximately 18,000 acres of soybeans, 4,600 acres of cotton, and 1,600 acres of corn were planted (*15*). Hayland, which is usually cropland in a rotation, amounted to 9,200 acres. This represents a production acreage of 33,400 acres, or 71 percent of the cropland. Nonproducing cropland acres are normally in conservation rotations or are lying idle.

In 1967, there was 36,000 acres of pastureland in the county (*2*). In 1974, there were 26,000 acres (*16*).

The potential of the soils in Shelby County for increased production of food and fiber is good. About 100,000 acres of potentially good cropland is being used as pastureland and woodland. Approximately 24,000 acres is lowland, which requires some drainage. Yields could be increased on land that is currently being cultivated if the most recent technology were applied. This soil survey can help land users make sound land management decisions and can facilitate the application of crop production technology.

Soil erosion is a major problem on about 60 percent of the cropland and 20 percent of the pastureland in Shelby County. If the slope is more than 2 percent, erosion is a hazard. Allen, Decatur, Dewey, Etowah, and Smithdale soils are some of the soils that have slopes of 2 percent or more and are presently being cultivated.

Loss of soil through erosion is damaging in several ways. Productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils, such as Dewey soils, that have a clayey subsoil and on soils that have a layer in or below the subsoil that restricts the rooting depth. Such layers include the bedrock of Gorgas soils. Erosion results in sedimentation that causes offsite damage. Controlling erosion on farmland minimizes the pollution of streams by sediment and improves the quality of water for municipal use, recreation, and fish and wildlife.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps a plant cover and crop residue on the surface for extended periods can hold soil losses to amounts that do not reduce the productive capacity of the soils. On livestock farms, legume and grass forage crops can be incorporated into the cropping system to reduce erosion on sloping areas. These crops also provide nitrogen and improve tilth for the crops that follow in the rotation.

Conservation tillage and leaving crop residue on the surface help to increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most soils in the survey area. No-tillage for corn and soybeans is effective in reducing erosion on sloping areas. This practice can be adapted to most soils in the survey area and can be used effectively in areas where the topography is unfavorable for terracing or contouring.

Terraces and diversions reduce the length of slopes and reduce runoff and erosion. They are most practical on deep, well drained and moderately well drained, evenly sloping soils. Most cultivated soils in the survey area are not suitable for terracing because most have irregular slopes. Diversions are most practical on toe slopes and benches that intercept surface runoff from hilly uplands and divert the water from the lower lying cropland fields. Contour farming is very effective in reducing erosion on cropland. This practice is best suited to soils that have smooth, uniform slopes.

Information regarding erosion control practices for each kind of soil is available at the local office of the Soil Conservation Service.

Soil tilth is an important factor in seed germination, and it affects the infiltration of water into the soil. Soils that have good tilth have a granular and porous surface layer.

Most of the soils that are used for crops in Shelby County have a fine sandy loam, loam, or silt loam surface layer that is light in color and low in organic matter content. Soils with a high silt content and weak structure in the surface layer are subject to sealing and crusting when exposed to intense rainfall. The crust is hard when dry and is almost impervious to water. It reduces infiltration of water and increases runoff. Regular additions of crop residue, manure, and other organic material help to improve soil structure and reduce crusting.

The use of large tractors and heavy equipment results in compaction of layers in some soils. These layers are normally 2 to 12 inches below the soil surface. They are called traffic pans, and they restrict infiltration of water and growth of plant roots. Soils that are likely to develop traffic pans include Allen, Greenville, Smithdale, and Nauvoo soils.

Seedbed preparation and cultivation are difficult on eroded or clayey areas because the original friable surface layer has been removed. Loss of the surface layer has occurred in many areas of Dewey soils.

Irrigation. The survey area has an adequate amount of rainfall for crops that are commonly grown; however, the distribution of rainfall during spring and summer is usually such that periods of drought occur practically every year. Irrigation is needed to prevent drought stress. All soils commonly used for cultivated crops are suited to irrigation, but infiltration rates may be reduced by 75 percent in some soils that have a poor structure as a result of past management practices.

Drainage is needed on several soils in the county. Some soils are naturally too wet for producing crops and pasture plants that are common in the area. On other soils, drainage can increase crop and pasture production. These other soils are the poorly drained Tupelo soils and the somewhat poorly drained Quitman soils.

Many areas of well drained or moderately well drained soils are crossed by intermittent narrow drainageways. The soils adjacent to the drainageways are often wet in spring and delay farming operations. Artificial drainage systems can be used to remove excess water from these low-lying areas. The areas can be planted earlier, and some turnrows can be eliminated.

Quitman soils have a perched water table in early winter and early spring. The water table is caused by slow permeability in the lower part of the subsoil. An underground tile drainage system is excellent for removing this perched water table. The land can then be planted earlier, thereby increasing yields. Also, underground drainage systems can be used to intercept seepage water on toe slopes and divert it from the lower lying cropland.

The design of both surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is needed in some areas to complete the system. Drains have to be more closely spaced in soils that have slow permeability than in the more permeable soils. Finding adequate outlets for both surface and subsurface drainage systems is difficult in many areas of the county.

Soil fertility is naturally low in most of the soils in the survey area. All but the Brilliant soils are acid. The soils on flood plains and terraces, such as Choccolocco soils, are slightly higher in natural fertility than are most soils on uplands. The soils need applications of ground limestone to raise the pH level sufficiently for optimum utilization of commercial fertilizer by plants. Crops on all of the soils in the survey area respond well to fertilizer. Levels of available phosphorus and potash are low in most of the soils. On all of the soils, additions of lime and fertilizer should be based on the results of soil tests, on the need of crops, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Field crops suited to the soils and climate of the survey include many that are not now commonly grown. Soybeans, cotton, corn, and grain sorghum are the main row crops. Peanuts, potatoes, and similar crops could be grown if economic conditions were favorable.

Specialty crops include tomatoes, pole beans, peas, sweet corn, greens, and melons. They make up a small acreage. These crops and other specialty crops are well suited to many soils in the county. If economic conditions were favorable, a large acreage could be grown. Apples and peaches are the only orchard crops grown commercially in the county, and the acreage is small. Plums and pears are also well suited to the area. Wheat and rye are the only close-grown crops that are planted for grain production. However, oats and barley can be grown. Information and suggestions for growing specialty crops can be obtained from local offices of the Cooperative Extension Service and Soil Conservation Service.

Pasture and hay crops are important in the survey area (fig. 11). Tall fescue, bahiagrass, common bermudagrass, hybrid bermudagrasses, and dallisgrass are the main perennial grasses grown for pasture and hay. Wheat, ryegrass, and rye are grown for annual cool-season forage, and millet, sorghum, and sorghum-sudan crosses provide most of the annual warm-season forage. These annuals are generally grown on cropland for temporary grazing. Arrowleaf clover, white clover, crimson clover, ball clover, and other cool-season forage legumes grow on most soils in the county, especially if agricultural limestone is applied to the soils in proper amounts. The warm-season forage legumes, such as sericea and annual lespedeza, are well adapted to most soils.

Several management practices are needed on all soils that are used for pasture and hay production. These practices include proper grazing or cutting heights, weed control, proper fertilization, rotation grazing, and scattering animal droppings. Cool-season perennial grasses, such as tall fescue, should not be grazed in summer so that food reserves can be stored in the plants for growth in fall. Overgrazing and low fertilization are the two greatest problems associated with pasture management. Both result in weak plants and poor stands that are quickly infested with weeds. The best way to prevent weeds from becoming established is to maintain a dense ground cover with the desired pasture species.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Figure 11.—Improved pasture on Dewey clay loam, 2 to 6 percent slopes, eroded.

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w,* or *s,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w* or *s* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Landscaping and Gardening

Robert F. Berry, conservation agronomist, Soil Conservation Service, helped prepare this section.

The primary use of the land in residential areas is for placement of houses and related driveways and streets. The remaining area of each lot may be used for a variety of purposes. Some of the most common uses are vegetative cover to prevent erosion and enhance the appearance of the home; gardens for vegetables or flowers and shrubs; orchards for fruits and nuts; recreation; habitat for animals and birds; shade to conserve energy use; vegetation and structures for the abatement of undesirable noise, visual areas, and winds; and disposal areas for septic tank effluent. Although most lots are small, residents usually choose to use the outdoor area for several purposes. Consequently, careful planning and a good understanding of the soil are needed to insure success and compatibility of land uses around the home.

This section contains general soil-related information for landscaping and gardening around the homesite. Additional information may be obtained in other sections of this survey. Other information, especially that which is not directly soil related, may be obtained from the Cooperative Extension Service; Soil Conservation Service; private consulting companies; and private lawn, garden, nursery, fertilizer, and seed businesses. The soils information needed for some areas is too detailed for the scope and map scale of this survey. For this reason, onsite soil investigations and testing are recommended in addition to use of soils information available in this survey and elsewhere.

Most of the soils in the residential area of Shelby County have been disturbed to some degree during construction of houses, streets, driveways, and utility service. Types of disturbance include cutting, filling, grading, excavating, and blasting. As a result, soil properties are more variable and less predictable than they were naturally. Onsite examination is a necessary part of planning land use for disturbed soils.

A noncompacted soil with good structure and tillage characteristics is about 50 percent actual mineral soil and 50 percent pore space. When the soil is in good condition for tillage, about half of the pore space is filled with water. A soil is compacted when the pore space has been greatly reduced by the weight of machinery or foot traffic forcing mineral soil solids into the pore space. As a result, the soil holds less air and water and is less permeable. Any soil that is naturally compact or has been mechanically compacted provides a very poor environment for roots, and poor root growth is reflected in poor quality of the part of the plant that is above the ground. Some of the poorest mediums for plant growth are soils of the Dewey, Tatum, and Townley series that have had the surface layer removed during grading so that the dense, firm subsoil is exposed. The dense soil material restricts root penetration, absorbs little rainfall, and causes excessive runoff. The subsoil is commonly exposed in areas where these and similar soils are mapped as complexes with urban land. Incorporating organic matter into the soil improves tilth and infiltration and makes a more desirable root medium. Areas that are subject to heavy foot traffic should be covered with a mulch such as pine bark, wood chips, gravel, or similar material for protection.

Some soils, such as Quitman and Tupelo, are classified as wet soils. Wetness limits the kinds of plants that can be grown to those tolerant of high moisture content in the soil. There are several methods of minimizing the effect of soil wetness. One method is installing underground tile drains in permeable soils to lower the water table. Bedding the surface layer of the soil can be used in slowly permeable soils, such as Tupelo soils, to develop a satisfactory rooting zone for some plants.

Surface runoff can be a problem on most of the soils in Shelby County. Poor planning in the design and placement of buildings and streets can result in increased runoff, which causes erosion, flooding, and sediment deposition. Many problems can be avoided by developing a comprehensive water management plan that covers surface runoff from the point of origin to the point of entry of stream channels. Although most plants used for gardening and landscaping can be grown on soils on flood plains, such as Choccolocco and Sterrett soils, consideration should be given to the effect of flood water and local water quality on the plants. Urban development tends to increase the frequency and severity of flooding in urban watersheds. Advice and assistance in solving drainage problems can be obtained from the Soil Conservation Service, municipal and county engineering departments, and private consulting companies.

Shallowness over bedrock and rock fragments in the soil affect the kinds of plants that can be grown. Cut and fill earth-moving activities sometimes expose bedrock and reduce the rooting zone of plants. In Gorgas, Sunlight, and Weogufka soils, which are naturally shallow to bedrock, removal of any soil material is damaging.

Some soils, such as Bodine, Fullerton, and Minvale, contain many rock fragments. The content of fragments is greater in the lower part of the soil. Root growth is adversely affected and available water capacity is reduced as the amount of fragments increases. Many disturbed areas have broken concrete, brick, and other urban debris buried under soil material that is too thin or too poor in quality to support desired plant growth. In such cases, topsoil applications are needed to produce an adequate rooting medium for plants.

Natural fertility is low in most of the soils in Shelby County. Most of the soils are strongly acid to very strongly acid. The surface layer contains the most nutrients and has the most favorable pH for most plants. In many areas, fertility of the surface layer has been increased by applications of lime and fertilizer. When the surface layer is removed during construction, the remaining soil is very acid and is extremely low in many important nutrients. Also, many nutrients are unavailable for plant use in acid soil conditions. Adding ground limestone to neutralize soil acidity and adding fertilizer to furnish plant nutrients is necessary in most soils. Disturbed soils generally need much greater amounts of lime and fertilizer. Lime and fertilizer should be applied according to soil test recommendations for the type of plants grown. Information on sampling for soil testing can be obtained from the Cooperative Extension Service, Soil Conservation Service, and many retail fertilizer businesses.

In the following paragraphs, some of the plants that are used in landscaping and gardening are briefly discussed. Some management relationships between these plants and the soil are included. Information in this section should be supplemented by consulting the Extension Service, Soil Conservation Service, and technical specialist in private landscaping and gardening businesses.

Grasses commonly used for landscaping in Shelby County are vegetatively propagated species, such as the zoysias, hybrid bermudagrasses, and centipedegrasses, and seeded species, such as fescues, common bermudagrass, bluegrass, and centipedegrass. Grasses commonly used for short-term cover include ryegrass, rye, wheat, sudangrass, and millets.

The vegetatively propagated plants are usually planted as sprigs, plugs, or solid sodding. Before planting, topsoil should be added where it is needed and lime and fertilizer should be mixed into the soil. The plants should be placed in close contact with the soil. Water should be applied to the plantings to insure that the root system becomes well established in the soil. Centipede and the various strains of zoysiagrass have moderate shade tolerance. Zoysia, however, generally requires a higher degree of maintenance. The various strains of hybrid bermudagrass are fast growing but lack of the shade tolerance of centipede and zoysia.

Common perennial grasses that are established by seeding include fine-leaf fescues and bluegrass for cool-season lawns and common bermudagrass and centipede for warm-season lawns. Before seeding, lime and fertilizer should be applied and mixed into the soil. Proper planting depth is important in establishing grasses from seed.

Short-term vegetative cover is used to protect the soil during construction or to provide soil cover between the planting seasons of the desired grass species. The most commonly used grasses for short-term cover are ryegrass for cool seasons and sudangrass or millets for warm seasons. They are annuals that die after the growing season.

Lime and fertilizer should be applied periodically according to recommendations based on soil tests.

Vines are very important vegetative cover for moderately shaded areas and steep slopes that cannot be mowed. Ground ivy, periwinkle, and honeysuckle can be used for ground cover. These plants can also be used in areas of rock outcrops and on walls and fences. All of these plants are propagated vegetatively, usually from potted plants or sprigs.

Mulches can be used for ground cover where traffic is too heavy for grass cover, where shrubs and flowers are desired with additional ground cover, and in densely shaded areas. Mulches provide very effective ground cover and erosion control for areas where immediate cover is needed or areas where no live vegetation is desired. Types of mulch include pine straw, small grain straw, hay, composted grass clippings, wood chips, pine bark, rocks, and several manufactured materials. The type of mulch to use is somewhat dependent on the potential for erosion. Mulches can also be used to conserve soil moisture and to control weeds around trees, shrubs, and flowers.

Shrubs are used primarily to enhance the appearance of homesites. They can also be used to control traffic in areas that will not tolerate traffic or where traffic is not desired. Shrubs can be very effective in dissipating the energy from raindrops and from water falling from roofs of houses. Many native and adapted species add variety to most residential settings. Reaction to acidity and fertility levels vary greatly with shrub types.

Vegetable and flower gardens are very important to many individuals and businesses. However, some soils are not suited to vegetables and flowers. Soils that have been disturbed by construction activities may not be productive unless topsoil is applied. Soils that have a slope of more than 8 percent have poor potential for vegetable gardening because of the erosion hazard. Soils on steep slopes generally have a thin surface layer. Where composted tree leaves and grass clippings have been incorporated into the soil, the soil generally is fertile and friable and moisture conditions are favorable. Additional information on vegetable crops is included in the "Crops and Pasture" section of this survey.

Most garden plants grow best in soils in which the pH is between 5.5 or 6.5 and the fertility level is high. Many gardeners have fertilized their gardens too much or have used fertilizers with the wrong combination of nutrients. A soil test is the only effective way to determine how much and what type of fertilizer to apply. Soil test information can be obtained from the Extension Service, Soil Conservation Service, private consultants, and retail fertilizer businesses.

Trees are important in landscaping homesites. Information on soil and tree relationships can be obtained in the sections "Woodland Management and Productivity" and "Detailed Soil Map Units." Specialized assistance in urban forestry can be obtained from the Alabama Forestry Commission or a qualified private forester.

Woodland Management and Productivity

Jerry L. Johnson, forester, Soil Conservation Service, helped prepare this section.

In Shelby County, 400,200 acres, or 77 percent of the county, is commercial forest land. The acreage in forest decreased one percent from 1963 to 1972. Private landowners own 64 percent of the forest land; industry owns 33 percent; and three percent is public forest land (*7*).

Most of the forest land in Shelby County is owned by landowners with over 500 acres of forest land. Fewer than 100 landowners own approximately 287,000 acres of forest land, and over 5,000 own approximately 103,300 acres. The remaining 9,900 acres of forest land is in Oak Mountain State Park (*3*).

Forest land in Shelby County consists of 29,000 acres of longleaf-slash pine, 116,000 acres of loblolly-shortleaf pine, 116,000 acres of oak-pine, 116,000 acres of oak-hickory, 17,400 acres of oak-gum-cypress, and 5,800 acres of elm-ash-cottonwood. Most of the acreage in the oak-pine and oak-hickory forests is best suited to pines. Forests in Shelby County contain 116,000 acres of sawtimber, 156,600 acres of poletimber, and 121,800 acres of seedlings and saplings. About 5,800 acres are nonstocked areas.

About 48 percent of the soils in Shelby County have a site index of 80 or above for loblolly pine. This includes about 192,000 acres of forest land (*13*).

At present, there are only a few small sawmills in Shelby County. Most of the harvested timber is shipped to forest industries in nearby counties. Some landowners cut and haul firewood to nearby Birmingham, where there is a great demand for fireplace wood.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at the 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

The rapidly growing population needs extensive areas of land dedicated to recreation. Oak Mountain State Park provides a broad range of recreational activities, including swimming, fishing, hiking, camping, and golf. The Lay Lake area and the Cahaba River are widely used for aquatic sports. The rougher land in Shelby County has potential for many recreational activities.

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, and beggarweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, saltgrass, cordgrass, rushes, and sedges.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 17.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*5*) and the system adopted by the American Association of State Highway and Transportation Officials (*4*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 17.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

The results of physical and chemical analyses of several typical pedons in the survey area are given in table 16. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Agronomy and Soils Mineralogy Laboratory at Alabama University, Auburn, Alabama.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods.

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1) (*12*).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1) (*12*).

Extractable bases—method of Hajek, Adams, and Cope (*6*).

Extractable acidity—method of Hajek, Adams, and Cope (*6*).

Cation-exchange capacity—sum of cations (5A3a) (*12*).

Cation-exchange capacity—ammonium chloride (5A7a) (*12*).

Base saturation—method of Hajek, Adams, and Cope (*6*).

Reaction (pH)—1:1 water dilution (8C1a) (*12*).

Engineering Index Test Data

Table 17 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by State of Alabama Highway Department Soils Laboratory.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*14*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning moist, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, mixed, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*11*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*14*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Allen Series

The Allen series consists of deep, well drained, moderately permeable soils that formed in medium textured alluvial, colluvial, and residual sediments. These nearly level to sloping soils are in limestone valleys and on high river and stream terraces. Slope ranges from 0 to 10 percent.

Allen soils are near Decatur, Quitman, and Tupelo soils. Decatur soils are on higher positions on the landscape than the Allen soils and have a clayey subsoil. Quitman soils are along drainageways and in depressional areas and are moderately well drained.

Tupelo soils are in depressional areas and have a gray, clayey control section.

Typical pedon of Allen loam, 2 to 6 percent slopes, in a cultivated field 2,000 feet west and 850 feet south of the northeast corner of sec. 23, T. 19 S., R. 2 E.

Ap—0 to 5 inches; yellowish brown (10YR 5/4) loam; weak fine granular structure; very friable; many fine and medium roots; medium acid; abrupt smooth boundary.

B21t—5 to 11 inches; yellowish red (5YR 5/8) loam; weak medium subangular blocky structure; friable; few fine and medium roots; broken faint clay films on faces of peds and around fragments; few fragments less than 1 cm; strongly acid; clear smooth boundary.

B22t—11 to 41 inches; yellowish red (5YR 5/8) loam; few medium distinct red (2.5YR 5/8) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; broken faint clay films on faces of peds; very strongly acid; clear smooth boundary.

B23t—41 to 54 inches; red (2.5YR 4/8) loam; many medium and coarse prominent yellowish brown (10YR 5/8), very pale brown (10YR 7/3), and light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; patchy faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

B24t—54 to 64 inches; mottled strong brown (7.5YR 5/8), yellowish brown (10YR 5/8), red (2.5YR 4/8), and yellow (10YR 7/8) sandy clay loam; weak medium subangular blocky structure; friable; patchy faint clay films on faces of some peds; very strongly acid.

Solum thickness is more than 60 inches. Unless the surface has been limed, reaction is strongly acid or very strongly acid. Some pedons have few fragments.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. Texture is sandy loam, loam, or silty clay loam.

The B2t horizon has hue of 7.5YR, 5YR, or 2.5YR; value of 4 through 6; and chroma of 4 through 8. Texture is loam, sandy clay loam, clay loam, or clay.

The C horizon, if present, is mottled in shades of yellow, brown, red, and gray. Texture is loam, clay loam, silty clay, or clay.

Bodine Series

The Bodine series consists of deep, somewhat excessively drained, moderately rapidly permeable soils that formed in cherty limestone residuum. These moderately steep to steep soils are on upland chert ridges. Slope ranges from 15 to 45 percent.

Bodine soils are near Etowah, Fullerton, and Minvale soils. Etowah soils are on lower positions on the landscape and are less than 15 percent chert in the subsoil. Fullerton soils have a red, clayey control section. Minvale soils are 15 to 35 percent chert fragments.

A typical pedon of Bodine cherty silt loam in an area of Bodine-Minvale complex, 25 to 45 percent slopes, in a wooded area 2,250 feet east and 2,450 feet north of the southwest corner of sec. 25, T. 20 S., R. 3 W.

A1—0 to 5 inches; dark brown (10YR 3/3) cherty silt loam; weak fine subangular blocky structure; friable; many small and medium roots; about 30 percent by volume chert fragments 2 mm or more across; strongly acid; gradual smooth boundary.

B21t—5 to 14 inches; yellowish red (5YR 5/6) very cherty silty clay loam; weak medium subangular blocky structure; friable; patchy faint clay films on faces of some peds and chert fragments; few medium roots; about 35 percent by volume chert fragments 2 mm or more across; strongly acid; gradual wavy boundary.

B22t—14 to 22 inches; yellowish red (5YR 5/6) extremely cherty silty clay loam; weak medium subangular blocky structure parting to weak fine subangular blocky; friable; patchy faint clay films on faces of some peds and chert fragments; about 65 percent by volume chert fragments 2 mm or more across; strongly acid; gradual wavy boundary.

B23t—22 to 72 inches; yellowish red (5YR 5/6) extremely cherty silty clay loam; weak fine subangular blocky structure; friable; patchy faint clay films on faces of some peds and chert fragments; about 80 percent by volume chert fragments 2 mm or more across; strongly acid.

Solum thickness and depth to cherty limestone bedrock are more than 60 inches. Unless the surface has been limed, reaction ranges from strongly acid to very strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 or 3. Texture is cherty silt loam or cherty loam.

The B2t horizon has hue of 5YR, 7.5YR, 10YR, or 2.5Y; value of 4 through 6; and chroma of 4 through 8. Texture is cherty silt loam, cherty loam, or cherty silty clay loam or the very cherty or extremely cherty analogs.

Content of chert fragments ranges from 35 to about 80 percent in the control section. The fragments range in size from 2 millimeters to about 3 feet across. Some pedons have many mottles in shades of red, brown, and yellow.

Brilliant Series

The Brilliant series consists of deep, somewhat excessively drained, moderately rapidly permeable soils. These strongly sloping to steep soils formed in mine spoil areas. The material is mainly shale, siltstone, and sandstone fragments. Slope ranges from 6 to 45 percent.

Brilliant soils are near soils that formed in sandstone, siltstone, and shale.

Typical pedon of Brilliant very channery loam, 6 to 45 percent slopes, in a reclaimed area 3,000 feet east and 2,000 feet north of the southwest corner of sec. 22, T. 21 S., R. 4 W.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) very channery loam; structureless; friable; about 75 percent by volume sandstone and shale fragments that have a thin platy structure; few small pieces of coal; neutral; gradual smooth boundary.

C—4 to 62 inches; dark grayish brown (2.5 4/2) very channery silt loam; structureless; friable; about 80 percent by volume sandstone and shaly siltstone fragments that have a thin platy structure; few small pieces of coal; neutral.

Depth to rock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline. Content of coarse fragments ranges from 60 to 80 percent in the A horizon and from 60 to 90 percent in the C horizon. Coarse fragments range in size from 1/4 inch to 3 feet or more and are sandstone, shaly siltstone, and shale.

The A horizon has hue of 10YR or 2.5Y, value of 4, and chroma of 1 through 4. Texture of the fine earth fraction is loam or silt loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 through 6. Texture of the fine earth fraction is loam, silt loam, or silty clay loam.

Choccolocco Series

The Choccolocco series consists of deep, well drained, moderately permeable soils. These nearly level soils formed on stream terraces. Slope ranges from 0 to 2 percent.

Choccolocco soils are near Quitman and Sterrett soils. Quitman and Sterrett soils are on lower positions on the landscape than the Choccolocco soils. Quitman soils are moderately well drained, and Sterrett soils are somewhat poorly drained.

Typical pedon of Choccolocco loam, occasionally flooded, in a pasture 1,425 feet west and 700 feet north of the southeast corner of sec. 29, T. 18 S., R. 1 W.

Ap—0 to 5 inches; brown (10YR 5/3) loam; weak fine granular structure; very friable; many small roots; strongly acid; abrupt smooth boundary.

B21t—5 to 11 inches; brownish yellow (10YR 6/6) silt loam; weak fine granular structure; friable; patchy faint clay films on faces of some peds; many fine and medium roots; strongly acid; clear smooth boundary.

B22t—11 to 22 inches; strong brown (7.5YR 5/8) silty clay loam; weak medium subangular blocky structure; friable; patchy faint clay films on faces of some peds; few medium roots; strongly acid; gradual smooth boundary.

B23t—22 to 47 inches; yellowish brown (10YR 5/8) loam; weak medium subangular blocky structure; friable; broken distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

C—47 to 65 inches; mottled light brownish gray (10YR 6/2), strong brown (7.5YR 5/6), and yellow (10YR 7/6) loam; massive; friable; strongly acid.

Solum thickness ranges from 45 to 60 inches. Unless the surface has been limed, reaction is medium acid or strongly acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 6. Texture is fine sandy loam, loam, or silt loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 8. Texture is silty clay loam, silt loam, or loam.

The C horizon has colors similar to those of the B2t horizon except that it has mottles in shades of brown and yellow. Texture is loam or sandy loam.

Decatur Series

The Decatur series consists of deep, well drained, gently sloping to sloping soils in valleys underlain by limestone. These soils formed in residuum of limestone. Slope ranges from 2 to 15 percent.

Decatur soils are near Allen, Dewey, Etowah, and Tupelo soils. Allen soils are on lower terrace positions than the Decatur soils and have a fine-loamy subsoil. Dewey soils have a control section that is not dark red. Etowah soils have a fine-loamy control section. Tupelo soils are in depressional areas and are dominantly gray.

Typical pedon of Decatur silt loam, 2 to 6 percent slopes, in a cultivated field 1,300 feet east and 350 feet north of the southwest corner of sec. 25, T. 21 S., R. 3 W.

Ap—0 to 6 inches; dark reddish brown (5YR 3/4) silt loam; weak fine subangular blocky structure; friable; many fine and common medium roots; slightly acid; abrupt smooth boundary.

B21t—6 to 18 inches; dark reddish brown (2.5YR 3/4) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm; common fine roots; continuous distinct clay films on faces of peds; about 5 percent by volume dark concretions; slightly acid; gradual smooth boundary.

B22t—18 to 70 inches; dark red (10YR 3/6) clay; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm; continuous clay films on faces of peds; about 5 percent by volume dark concretions; strongly acid.

Solum thickness and depth to rock are more than 72 inches. Unless the surface has been limed, reaction is medium acid or strongly acid. Dark concretions range from none to many in each horizon.

The A horizon has hue of 5YR or 2.5YR, value of 2 or 3, and chroma of 2 to 4. Texture is loam, silt loam, or silty clay loam.

The B2t horizon has hue of 2.5YR or 10R, value of 3, and chroma of 4 or 6. Texture is silty clay loam, silty clay, or clay. Content of chert fragments, less than 3 inches in diameter, ranges from 0 to about 10 percent.

Dewey Series

The Dewey series consists of deep, well drained, moderately permeable soils that formed in clayey residuum of limestone. These nearly level to sloping soils are in valleys underlain by limestone. Slope ranges from 2 to 10 percent.

Dewey soils are near Decatur, Etowah, Quitman, and Tupelo soils. Decatur and Etowah soils are on landscape positions similar to those of the Dewey soils. Decatur soils have a clayey control section that is dark red. Etowah soils have a fine-loamy subsoil. Quitman soils are on the lower positions and are moderately well drained. Tupelo soils are in depressional areas and have a gray subsoil.

Typical pedon of Dewey clay loam, 2 to 6 percent slopes, eroded, in a pasture 2,300 feet west and 900 feet north of the southeast corner of sec. 2, T. 22 S., R. 3 W.

Ap—0 to 5 inches; yellowish red (5YR 4/6) clay loam; weak medium granular structure; friable; few fine roots; few dark concretions; strongly acid; clear smooth boundary.

B21t—5 to 12 inches; yellowish red (5YR 4/8) silty clay; moderate medium subangular blocky structure parting to weak medium subangular blocky; very firm; many fine roots; continuous distinct clay films on faces of peds; about 5 percent by volume dark concretions; few wormholes and castings; strongly acid; gradual smooth boundary.

B22t—12 to 22 inches; yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure; very firm; continuous distinct clay films on faces of peds; about 5 percent by volume dark concretions; strongly acid; gradual smooth boundary.

B23t—22 to 48 inches; yellowish red (5YR 5/8) clay; common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; very firm; continuous distinct clay films on faces of peds; about 5 percent by volume dark concretions; strongly acid; gradual smooth boundary.

B24t—48 to 70 inches; mottled yellowish red (5YR 5/8), yellowish brown (10YR 5/8), and dark red (2.5YR 3/6) clay; weak medium subangular blocky structure; very firm; continuous distinct clay films on faces of peds; strongly acid.

Solum thickness and depth to limestone bedrock are more than 60 inches. Unless the surface has been limed, reaction is strongly acid or very strongly acid. Content of chert and manganese concretions ranges from 0 to about 10 percent by volume.

The A horizon has hue of 10YR, 7.5YR, or 5YR; value of 4 or 5; and chroma of 3 through 6. Texture is loam, silt loam, silty clay loam, or clay loam.

The B2t horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. Mottles are in shades of yellow, red, and brown. Texture is silty clay or clay.

Etowah Series

The Etowah series consists of deep, well drained, moderately permeable soils that formed in limestone residuum and colluvium. These nearly level to strongly sloping soils are on side slopes and toe slopes of the uplands. Slope ranges from 2 to 15 percent.

Etowah soils are near Dewey, Decatur, Quitman, and Tupelo soils. Dewey and Decatur soils are on landscape positions similar to those of Etowah soils and have a clayey control section. Quitman soils are on lower positions and are moderately well drained. Tupelo soils are in depressional areas and have a gray clayey subsoil.

Typical pedon of Etowah silt loam, 2 to 6 percent slopes, in a wooded area 500 feet east and 2,300 feet south of the northwest corner of sec. 31, T. 21 S., R. 2 W.

A1—0 to 5 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; friable; many small and medium roots; about 10 percent by volume chert fragments 2 mm to 5 mm across; few wormholes and castings; strongly acid; clear smooth boundary.

B21t—5 to 12 inches; strong brown (7.5YR 5/6) silt loam; weak fine subangular blocky structure; friable; few small roots; broken faint clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—12 to 37 inches; yellowish red (5YR 5/6) silty clay loam; weak fine subangular blocky structure; friable; many medium pores; broken distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

B23t—37 to 60 inches; yellowish red (5YR 5/6) silt loam; common medium faint yellowish red (5YR 4/8) and common medium distinct yellow (10YR 7/6) and very pale brown (10YR 7/3) mottles; weak fine subangular blocky structure; friable; broken distinct clay films on faces of peds; strongly acid.

Solum thickness and depth to rock are more than 60 inches. Unless the surface has been limed, reaction ranges from strongly acid to very strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. Texture is loam or silt loam. Content of chert fragments ranges from 0 to 15 percent.

The B2t horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. Texture is silt loam, silty clay loam, or clay loam and ranges to clay or silty clay in the lower part of the B2t horizon. The lower part of the B2t horizon is mottled in shades of brown, red, and yellow. Content of chert fragments ranges from 0 to 15 percent.

Fullerton Series

The Fullerton series consists of deep, well drained, moderately permeable soils that formed in residuum of cherty limestone. These gently sloping to steep soils are on hills and side slopes. Slope ranges from 2 to 35 percent.

Fullerton soils are near Bodine, Etowah, Minvale, and Quitman soils. Etowah and Minvale soils are fine-loamy and are on landscape positions similar to those of the Fullerton soils. The steeper Bodine soils are more than 35 percent fragments and are on the higher landscape positions. Quitman soils are along drainageways and in depressional areas and are moderately well drained.

Typical pedon of Fullerton cherty loam, in an area of Minvale-Fullerton complex, 6 to 15 percent slopes, in a pasture 1,500 feet east and 200 feet north of the southwest corner of sec. 31, T. 19 S., R. 2 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) cherty loam; weak fine granular structure; friable; many fine roots; about 15 percent by volume angular chert fragments; strongly acid; abrupt smooth boundary.

B21t—6 to 12 inches; reddish yellow (7.5YR 6/6) cherty silty clay loam; moderate medium subangular blocky structure parting to weak medium subangular blocky; friable; patchy clay films on faces of peds and around chert fragments; few fine roots; about 25 percent, by volume, angular chert fragments; strongly acid; gradual smooth boundary.

B22t—12 to 38 inches; yellowish red (5YR 5/6) cherty silty clay; few and common distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds and around chert fragments; 30 percent angular chert fragments; strongly acid; gradual smooth boundary.

B23t—38 to 63 inches; mottled yellowish red (5YR 5/6), brownish yellow (10YR 6/6), and yellow (10YR 7/6) cherty silty clay; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds and around chert fragments; 25 percent angular chert fragments; strongly acid.

Solum thickness and depth to rock are 80 inches or more. Unless the surface has been limed, reaction ranges from strongly acid to very strongly acid. Content of chert fragments ranges from 15 to 35 percent.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 6. Texture is cherty loam or cherty silt loam.

The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons, the upper part of the subsoil has hue of 7.5YR, value of 5 or 6, and chroma of 6 or 8. Texture is cherty clay loam, cherty silty clay loam, cherty clay, or cherty silty clay. Mottles of brown, yellow, and red are in the lower part of the B2t horizon in some pedons.

Gorgas Series

The Gorgas series consists of shallow, well drained, moderately permeable soils that formed in residuum of sandstone. These nearly level to strongly sloping soils are on upper side slopes and ridgetops of the uplands. Slope ranges from 6 to 15 percent.

Gorgas soils are near Hanceville, Mountainburg, and Nauvoo soils. Hanceville soils are on ridgetops and have a clayey control section that is dark red. Mountainburg soils are more than 35 percent fragments. Nauvoo soils are on upper side slopes and have a solum that is more than 30 inches thick. Also included are soils that are similar to Gorgas soils except that they are deeper than 20 inches to bedrock.

Typical pedon of Gorgas loamy sand in an area of Gorgas-Rock outcrop complex, 6 to 15 percent slopes, in a wooded area 1,425 feet west and 800 feet north of the southeast corner of sec. 12, T. 20 S., R. 4 W.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; friable; common fine and medium roots; about 5 percent by volume sandstone fragments 3 to 6 inches in diameter and 10 percent by volume fragments 1/8 inch to 3 inches in diameter; strongly acid; clear smooth boundary.

B2t—6 to 14 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few medium roots; about 5 percent by volume sandstone fragments 3 to 6 inches in diameter and 5 percent by volume fragments 1/8 inch to 3 inches in diameter; sand grains coated and bridged with clay; strongly acid; abrupt wavy boundary.

R—14 inches; hard, massive sandstone bedrock.

Solum thickness and depth to rock range from 10 to 20 inches. Reaction ranges from strongly acid to very strongly acid. Content of coarse fragments is less than 25 percent.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3. Texture is loamy sand, sandy loam, fine sandy loam, or loam.

The B horizon has hue of 10YR, 7.5YR, or 5YR; value of 4 or 5; and chroma of 3 through 6. Texture is sandy loam, fine sandy loam, or loam.

Greenville Series

The Greenville series consists of deep, well drained, moderately permeable soils that formed in fine textured marine sediments. These nearly level to sloping soils are on Coastal Plain uplands. Slope ranges from 2 to 10 percent.

Greenville soils are near Quitman and Smithdale soils. Smithdale soils have a fine-loamy control section. Quitman soils are moderately well drained.

Typical pedon of Greenville loam, 2 to 10 percent slopes, in a wooded area 425 feet west and 1,400 feet north of the southeast corner of sec. 17, T. 24 N., R. 12 E.

A1—0 to 5 inches; reddish brown (5YR 4/4) loam; weak fine granular structure; friable; many medium and coarse roots; few wormholes and castings; common dark concretions; strongly acid; clear smooth boundary.

B21t—5 to 22 inches; dark red (2.5YR 3/6) sandy clay; weak medium subangular blocky structure parting to moderate fine subangular blocky; firm; few medium roots; broken distinct clay films on faces of peds; common dark concretions; strongly acid; clear smooth boundary.

B22t—22 to 60 inches; dark red (2.5YR 3/6) sandy clay; moderate medium subangular blocky structure parting to weak medium subangular blocky; firm; broken distinct clay films on faces of peds; common dark concretions; strongly acid.

Solum thickness is 72 inches or more. Unless the surface has been limed, reaction is strongly acid or very strongly acid.

The A horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 3 through 5, and chroma of 2 through 6. Texture is loam, fine sandy loam, or sandy loam.

The B2t horizon has hue of 2.5YR or 10R, value of 2 or 3, and chroma of 2 through 6. Texture is sandy clay loam, sandy clay, or clay. Content of dark concretions ranges from 0 to 10 percent.

Hanceville Series

The Hanceville series consists of deep, well drained, moderately permeable soils that formed in residuum of sandstone. These nearly level to strongly sloping soils are on mountaintops and ridgetops. Slope ranges from 6 to 15 percent.

Hanceville soils are near Gorgas, Mountainburg, and Nauvoo soils. Mountainburg and Gorgas soils are on side slopes and are underlain by rock at a depth of 20 inches or less. Nauvoo soils are fine-loamy, have a solum that is more than 30 inches thick, and are on similar positions on the landscape.

Typical pedon of Hanceville loam, 6 to 15 percent slopes, in a subdivision 600 feet west and 1,700 feet south of the northeast corner of sec. 14, T. 20 S., R. 4 W.

Ap—0 to 7 inches; dark reddish brown (5YR 3/4) loam; weak fine granular structure; friable; many fine and common medium roots; medium acid; clear smooth boundary.

B21t—7 to 37 inches; dark reddish brown (2.5YR 3/4) clay; moderate medium subangular blocky structure; firm; common fine roots; few fine discontinuous vesicular pores; continuous clay films on faces of peds; dark brown concretions 1 millimeter to 3 millimeters in diameter; very strongly acid; gradual smooth boundary.

B22t—37 to 70 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure parting to weak medium subangular blocky; firm; continuous distinct clay films on faces of peds; common dark concretions 1 millimeter to 3 millimeters in diameter; very strongly acid.

Solum thickness is more than 60 inches. Unless the surface has been limed, reaction is strongly acid or very strongly acid.

The A horizon has hue of 7.5YR or 5YR, value of 3 or 4, and chroma of 3 through 6. Texture is loam or sandy loam.

The B2t horizon has hue of 2.5YR or 10R, value of 3 or 4, and chroma of 4 or 6. Texture is clay loam, sandy clay, or clay.

Content of sandstone fragments and manganese concretions ranges from 0 to about 10 percent.

Minvale Series

The Minvale series consists of deep, well drained, moderately permeable soils that formed in residuum of cherty limestone. These sloping to steep soils are on side slopes and toe slopes of the uplands. Slope ranges from 6 to 45 percent.

Minvale soils are near Bodine, Etowah, Fullerton, and Quitman soils. Bodine soils are on higher positions on the landscape than the Minvale soils and are more than 35 percent coarse fragments. Etowah soils are on similar, less sloping positions on the landscape and have less than 15 percent coarse fragments. Fullerton soils are on similar positions on the landscape and have a red, clayey control section. Quitman soils are moderately well drained.

Typical pedon of Minvale cherty silt loam in an area of Minvale-Fullerton complex, 6 to 15 percent slopes, in a wooded area 950 feet east and 1,650 feet south of the northwest corner of sec. 12, T. 19 S., R. 1 W.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) cherty silt loam; weak fine granular structure; friable; many fine and medium roots; about 15 percent by volume chert fragments; strongly acid; clear smooth boundary.

B21t—6 to 11 inches; strong brown (7.5YR 5/8) cherty silty clay loam; weak medium subangular blocky structure parting to weak fine subangular blocky; friable; many fine and medium roots; patchy faint clay films on faces of some peds; about 20 percent by volume chert fragments; strongly acid; clear smooth boundary.

B22t—11 to 50 inches; strong brown (7.5YR 5/6) cherty silty clay loam; weak medium subangular blocky structure; friable; few medium roots; faint patchy clay films on faces of some peds; about 20 percent by volume chert fragments; strongly acid; clear smooth boundary.

B23t—50 to 65 inches; mottled red, yellow, brown, and gray cherty silty clay loam; weak medium subangular blocky structure; friable; patchy faint clay films on faces of some peds; about 30 percent by volume chert fragments; strongly acid.

Solum thickness and depth to rock are more than 60 inches. Unless the surface has been limed, reaction is strongly acid or very strongly acid. Content of chert fragments ranges from 15 to 35 percent.

The A horizon has hue or 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 4. Texture is cherty silt loam or cherty loam.

The B2t horizon has hue of 10YR, 7.5YR, or 5YR; value of 4 or 5; and chroma of 4 through 8. Texture of the B21t horizon is cherty silty clay loam or cherty loam. The lower part of the B2t horizon is cherty silty clay loam, cherty clay loam, cherty silty clay, or cherty clay. Mottles in shades of gray, yellow, brown, and red are common in the lower part of the subsoil. Content of chert fragments ranges from 15 to 35 percent.

Mountainburg Series

The Mountainburg series consists of shallow, well drained, moderately rapidly permeable soils that formed in residuum of sandstone. These moderately steep to steep soils are on side slopes. Slope ranges from 15 to 65 percent.

Mountainburg soils are near Gorgas, Hanceville, and Nella soils. Gorgas soils are on less sloping side slopes and are less than 35 percent fragments. Hanceville soils are on ridgetops and have a dark red clayey control section. Nella soils are on lower side slopes and have a solum that is more than 60 inches thick.

Typical pedon of Mountainburg gravelly sandy loam in an area of Nella-Mountainburg association, steep, in a wooded area 2,200 feet west and 2,600 feet south of the northeast corner of sec. 9, T. 18 S., R. 1 E.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) gravelly sandy loam, weak fine granular structure; friable; many small and medium roots; about 15 percent by volume sandstone fragments; medium acid; clear smooth boundary.

B21t—3 to 8 inches; yellowish brown (10YR 5/4) stony sandy loam; weak fine granular structure; friable; many small roots; sand grains are coated and bridged; 35 percent sandstone fragments; very strongly acid; clear smooth boundary.

B22t—8 to 15 inches; yellowish brown (10YR 5/6) very stony sandy loam; weak fine granular structure; friable; many small roots; sand grains are coated and bridged; 45 percent sandstone fragments; very strongly acid; diffuse wavy boundary.

R—15 inches; hard, massive sandstone bedrock.

Solum thickness and depth to rock range from 12 to 20 inches. Content of sandstone fragments ranges from 35 to 60 percent by volume. Reaction in the A horizon is medium acid to very strongly acid. Reaction in the B horizon is strongly acid or very strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3. Texture is fine sandy loam or sandy loam or their gravelly analogs.

The B2t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 or 6. Texture of the fine-earth fraction is sandy loam, loam, or sandy clay loam. The horizon is very gravelly, very channery, stony, or very stony.

Nauvoo Series

The Nauvoo series consists of moderately deep, well drained, moderately permeable soils that formed in residuum of sandstone or interbedded sandstone and siltstone. These gently sloping to steep soils are on side slopes and ridgetops of the uplands. Slope ranges from 2 to 35 percent.

Nauvoo soils are near Gorgas, Hanceville, Nella, Pirum, Quitman, Sunlight, and Townley soils. Gorgas soils are underlain by sandstone at a depth of less than 20 inches. Hanceville soils are on ridgetops and have a dark red, clayey control section. Nella soils have a solum that is more than 60 inches thick, and they are on toe slopes. Pirum soils have a yellow solum and are very steep. Sunlight soils are more than 35 percent siltstone fragments. Townley soils are underlain by shale and have a clayey control section. Quitman soils are moderately well drained and are along drainageways and in depressional areas.

Typical pedon of Nauvoo loam, 2 to 8 percent slopes, in a wooded area 800 feet west and 750 feet north of the southeast corner sec. 26, T. 21 S., R. 4 W.

A1—0 to 2 inches; dark brown (10YR 4/3) loam; weak fine granular structure; very friable; few fine and medium roots; medium acid; clear smooth boundary.

A2—2 to 5 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; very friable; few fine and medium roots; strongly acid; clear wavy boundary.

B21t—5 to 10 inches; yellowish red (5YR 5/6) clay loam; moderate fine subangular blocky structure; broken faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22t—10 to 28 inches; red (2.5YR 5/8) clay loam; few medium distinct strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; friable; broken distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

B23t—28 to 33 inches; red (2.5YR 5/8) clay loam; few medium prominent brownish yellow (10YR 6/8) mottles; moderate fine subangular blocky structure; friable; broken distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

B3—33 to 40 inches; mottled brownish yellow (10YR 6/8), strong brown (7.5YR 5/8), and red (2.5YR 4/8) clay loam; relict rock structure with some material from horizon above in pockets along bedding planes; massive; friable; very strongly acid; gradual irregular boundary.

C—40 to 48 inches; mottled brownish yellow (10YR 6/8), strong brown (7.5YR 5/8), and red (2.5YR 4/8) sandy clay loam; massive; friable; very strongly acid; clear wavy boundary.

Cr—48 to 60 inches; red, brown, and yellow soft rippable sandstone.

Solum thickness ranges from 30 to 50 inches, and depth to soft, massive sandstone bedrock is 40 to 60 inches. Unless the surface has been limed, reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. Texture is fine sandy loam, sandy loam, or loam.

The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 through 8. Texture is loam, sandy clay loam, or clay loam. Mottles are in shades of yellow, brown, and red and are common in the B2t and C horizons.

The B3 and C horizons have colors and textures similar to those of the B2t horizon.

The Cr horizon is soft, massive interbedded sandstone and siltstone in shades of red, yellow, and brown.

Nella Series

The Nella series consists of deep, well drained, moderately permeable soils that formed in colluvium from sandstone residuum. These moderately steep to steep, cobbly or gravelly soils are on lower side slopes of uplands underlain by sandstone, shaly siltstone, and shale. Slope ranges from 15 to 65 percent.

Nella soils are near Mountainburg and Nauvoo soils. Mountainburg soils are on upper side slopes and are underlain by sandstone rock at a depth of less than 20 inches. Nauvoo soils are on upper side slopes and have a solum that is less than 50 inches thick.

Typical pedon of Nella cobbly sandy loam in an area of Nella-Mountainburg association, steep, in a wooded area 1,600 feet east and 1,650 feet south of the northwest corner of sec. 10, T. 18 S., R. 1 E.

A1—0 to 5 inches; brown (10YR 4/3) cobbly sandy loam; weak fine granular structure; friable; many fine and medium roots; about 30 percent by volume sandstone fragments; strongly acid; clear smooth boundary.

B21t—5 to 18 inches; yellowish red (5YR 5/8) cobbly sandy clay loam; weak medium subangular blocky structure; friable; few medium roots; patchy distinct clay films on faces of some peds; about 30 percent by volume sandstone fragments; strongly acid; gradual wavy boundary.

B22t—18 to 56 inches; yellowish red (5YR 5/6) cobbly sandy clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; patchy distinct clay films on faces of some peds; about 35 percent by volume sandstone fragments; strongly acid; gradual wavy boundary.

B23t—56 to 70 inches; yellowish red (5YR 5/6) cobbly sandy clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; patchy distinct clay films on faces of peds; about 35 percent by volume sandstone fragments; strongly acid.

Solum thickness is more than 60 inches. Content of sandstone fragments ranges from 15 to 35 percent by volume. Reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 2 through 4. Texture is sandy loam, fine sandy loam, or loam and is cobbly or gravelly.

The B2t horizon has hue of 5YR or 2.5YR, value of 4 through 6, and chroma of 6 or 8. Texture is clay loam or sandy clay loam and is cobbly or gravelly. Mottles in shades of brown, yellow, and red range from none to common.

Pirum Series

The Pirum series consists of moderately deep, well drained, moderately permeable soils that formed in sandstone residuum. These steep soils are on side slopes of the uplands. Slope ranges from 25 to 60 percent.

Pirum soils are near Nauvoo, Sunlight, and Townley soils. Nauvoo soils are on ridgetops and have a solum more than 30 inches thick. Sunlight soils are on side slopes and are underlain by shaly siltstone at a depth of less than 20 inches. Townley soils are on ridgetops and side slopes and have a clayey control section.

Typical pedon of Pirum fine sandy loam, 25 to 60 percent slopes, in a wooded area 1,600 feet west and 600 feet north of the southeast corner of sec. 25, T. 21 S., R. 4 W.

A1—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; many medium and fine roots; about 10 percent by volume sandstone fragments; strongly acid; gradual smooth boundary.

B21t—5 to 20 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; patchy distinct clay films on faces of peds; many medium and fine roots; about 10 percent by volume sandstone fragments; strongly acid; gradual wavy boundary.

B22t—20 to 28 inches; yellowish brown (10YR 5/6) gravelly loam; weak fine granular structure; friable; patchy distinct clay films on faces of peds and around fragments; few medium roots; about 30 percent by volume rounded quartz gravel and sandstone fragments; strongly acid; gradual irregular boundary.

R—28 to 45 inches; brown and yellow sandstone conglomerate.

Solum thickness and depth to rock range from 25 to 38 inches. Content of fragments ranges by volume from 0 to 30 percent in the A and B horizons. Reaction ranges from strongly acid to very strongly acid.

The A horizon has hue of 10YR and value of 4 or 5 and chroma of 3 or value of 4 and chroma of 4. Texture is fine sandy loam, sandy loam, or loam or the gravelly analogs.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. Texture is loam, sandy loam, or sandy clay loam or their gravelly analogs.

Quitman Series

The Quitman series consists of deep, moderately well drained, moderately permeable soils that formed in medium to fine textured alluvium. These nearly level to gently sloping soils are on toe slopes and on benches and along drainageways. They have a water table within 2 feet of the surface during winter and spring. Slope ranges from 0 to 4 percent.

Quitman soils are near Allen, Choccolocco, Etowah, Fullerton, Greenville, Nauvoo, Smithdale, Sterrett, Tatum, Townley, Tupelo, and Weogufka soils. Allen, Etowah, Fullerton, Greenville, Nauvoo, Smithdale, Tatum, Townley, and Weogufka soils are well drained and are on adjacent, higher positions on the landscape than the Quitman soils. Choccolocco soils are on similar positions on the landscape and are well drained. Sterrett and Tupelo soils are somewhat poorly drained and are on the lower positions.

Typical pedon of Quitman loam, 0 to 4 percent slopes, in grass sod 1,000 feet east and 1,200 feet south of the northwest corner of sec. 36, T. 21 S., R. 1 W.

Ap—0 to 6 inches; yellowish brown (10YR 5/4) loam; weak fine granular structure; friable; many fine and medium roots; strongly acid; gradual smooth boundary.

B21t—6 to 13 inches; olive yellow (2.5Y 6/6) loam; common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; patchy distinct clay films on faces of some peds; few medium roots; very strongly acid; gradual smooth boundary.

B22t—13 to 35 inches; olive yellow (2.5Y 6/8) loam; few fine distinct strong brown (7.5YR 5/6) and common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; patchy distinct clay films on faces of some peds; very strongly acid; gradual smooth boundary.

B23t—35 to 70 inches; mottled light yellowish brown (2.5Y 6/4), yellowish brown (10YR 5/6), and light gray (10YR 7/1) loam; strong coarse subangular blocky structure parting to moderate medium subangular blocky; firm; slightly brittle and compacted in about 10 percent of the matrix; patchy faint clay films on faces of some peds; very strongly acid.

Solum thickness and depth to rock are 60 inches or more. Unless the surface has been limed, reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is fine sandy loam, silt loam, or loam.

The B2t horizon has hue of 10YR of 2.5Y, value of 5 or 6, and chroma of 4 to 8. Texture is clay loam, loam, or sandy clay loam. It has 10 to 20 percent brittleness of matrix.

The lower part of the B2t horizon is mottled in shades of brown, gray, and yellow. Content of dark concretions ranges from 0 to 10 percent.

Smithdale Series

The Smithdale series consists of deep, well drained, moderately permeable soils that formed in thick beds of medium textured marine deposits. These sloping to strongly sloping soils are on ridgetops and side slopes of Coastal Plain uplands. Slope ranges from 5 to 15 percent.

Smithdale soils are near Greenville and Quitman soils. Greenville soils have a dark red, clayey control section. Quitman soils are moderately well drained and occur along drainageways and depressional areas.

Typical pedon of Smithdale sandy loam, 5 to 8 percent slopes, in a cultivated field 700 feet west and 2,300 feet south of the northeast corner of sec. 12, T. 24 N., R. 13 E.

Ap—0 to 5 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; few small roots; strongly acid; abrupt smooth boundary.

B21t—5 to 17 inches; red (2.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; few medium and small roots; patchy faint clay films on faces of some peds; strongly acid; gradual smooth boundary.

B22t—17 to 60 inches; red (2.5YR 5/8) sandy clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; patchy faint clay films on faces of some peds; strongly acid.

Solum thickness is more than 60 inches. Unless the surface has been limed, reaction ranges from strongly acid to very strongly acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. Texture is sandy loam or fine sandy loam.

The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Texture is loam, clay loam, or sandy clay loam. The horizon is mottled in shades of red and brown. Content of quartz gravel ranges from 0 to 10 percent.

Sterrett Series

The Sterrett series consists of deep, somewhat poorly drained, slowly permeable soils that formed in medium and fine textured fluvial sediments. These nearly level soils are on low stream terraces and broad upland flats. Slope ranges from 0 to 2 percent.

The Sterrett soils are near Choccolocco, Quitman, and Townley soils. The Townley soils are on uplands and are well drained. The Choccolocco and Quitman soils are on slightly higher positions on the landscape. Choccolocco soils are well drained, and Quitman soils are moderately well drained.

Typical pedon of Sterrett silt loam in a pasture 100 feet east and 300 feet north of the southwest corner of sec. 30, T. 20 S., R. 2 W.

Ap—0 to 4 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; very friable; many medium and fine roots; very strongly acid; clear smooth boundary.

A2—4 to 8 inches; very pale brown (10YR 7/3) silt loam; few fine faint yellowish brown mottles; moderate medium granular structure; very friable; common medium and fine roots; common fine vesicular pores; few fine dark brown concretions; strongly acid; clear wavy boundary.

B21t—8 to 14 inches; yellowish brown (10YR 5/6) silt loam; light brownish gray (10YR 6/2) and light gray (10YR 7/2) coatings on ped exteriors; moderate medium subangular blocky structure; friable; few medium and fine roots; few fine vesicular pores; few patchy distinct clay films on faces of peds; strongly acid; clear wavy boundary.

B22tg—14 to 40 inches; mottled light brownish gray (10YR 6/2) and light gray (10YR 7/2) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine vesicular pores; few patchy distinct clay films on faces of peds; few fine dark brown and black concretions; strongly acid; gradual wavy boundary.

B23tg—40 to 58 inches; light gray (10YR 6/1) clay loam; many medium distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few patchy faint clay films on faces of peds; strongly acid; gradual wavy boundary.

B3—58 to 74 inches; mottled light gray (10YR 6/1), yellowish brown (10YR 5/6), and brownish yellow (10YR 6/6) stratified sandy clay loam and sandy loam; weak medium subangular blocky structure; friable; common fine dark brown and black concretions; medium acid.

Solum thickness ranges from 40 to more than 60 inches. Content of dark concretions less than 1/4 inch in diameter ranges from 0 to 15 percent, by volume, throughout. Unless the surface has been limed, reaction ranges from strongly acid to very strongly acid.

The A1 or Ap horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 through 4. Texture is fine sandy loam, sandy loam, or silt loam.

The A2 horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4.

Some pedons have a B1 horizon. The B1 horizon has hue of 10YR, or 2.5Y, value of 4 through 6, and chroma of 3 through 6. Texture is sandy loam, silt loam, or loam.

The B21t horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 4 through 6. Thickness of the

B2t horizon is 26 to 60 inches. The B2tg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of yellow and brown. Texture is silt loam, loam, clay loam, or silty clay loam.

The C horizon has colors and textures similar to those of the B2t horizon and has mottles in shades of brown, yellow, and gray.

Sunlight Series

The Sunlight series consists of shallow, well drained, moderately permeable soils that formed in residuum of siltstone or shaly siltstone. These strongly sloping to moderately steep soils are on ridgetops and side slopes of the uplands. Slope ranges from 8 to 25 percent.

Sunlight soils are near Nauvoo, Pirum, and Townley soils. Nauvoo soils are on ridgetops and have a solum more than 30 inches thick. Pirum soils are on steep side slopes and are less than 35 percent fragments. Townley soils have a clayey control section.

Typical pedon of Sunlight channery silt loam in a wooded area of Nauvoo-Sunlight complex, 15 to 25 percent slopes, 700 feet east and 1,550 feet south of the northwest corner of sec. 36, T. 18 S., R. 2 W.

O1—1 inch to 0; very dark brown (10YR 2/2) organic material.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak fine granular structure; friable; many fine and medium roots; 15 percent siltstone fragments; strongly acid; clear wavy boundary.

B1—2 to 5 inches; yellowish brown (10YR 5/4) channery silt loam; weak fine granular structure; friable; common medium roots; about 40 percent by volume siltstone fragments; strongly acid; clear wavy boundary.

B2t—5 to 12 inches; yellowish brown (10YR 5/6) extremely channery silty clay loam; weak fine granular structure; friable; patchy distinct clay films on faces of peds and around fragments; common medium roots; about 70 percent by volume siltstone fragments; strongly acid; clear wavy boundary.

Cr—12 to 30 inches; tilted, fractured, and rippable shaly siltstone.

Solum thickness and depth to siltstone are 10 to 20 inches. Unless the surface has been limed, reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 through 6, and chroma of 2 through 4. Texture is channery silt loam or channery loam.

The B horizon has hue of 2.5Y, 10YR, or 7.5YR, value of 3 through 6, and chroma of 2 through 4. Texture is channery silt loam, channery loam, or channery silty clay loam or their very channery analogs.

The percent of siltstone fragments in the profile ranges from 15 percent in the A horizon to nearly 90 percent in the B horizon.

Tatum Series

The Tatum series consists of deep, well drained, moderately permeable soils that formed in residuum of schist or phyllite. These gently sloping to moderately steep soils are on side slopes and ridgetops. Slope ranges from 4 to 25 percent.

Tatum soils are near Quitman and Weogufka soils. Quitman soils are along drainageways and are moderately well drained. Weogufka soils are underlain by slate or phyllite at a depth of less than 20 inches and are more than 35 percent fragments.

Typical pedon of Tatum silt loam, 4 to 12 percent slopes, in a wooded area 1,540 feet east and 720 feet north of the southwest corner of sec. 12, T. 22 S., R. 15 E.

Ap—0 to 6 inches; dark brown (7.5YR 4/4) silt loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

B21t—6 to 23 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm; few medium roots; patchy distinct clay films on faces of some peds; strongly acid; gradual smooth boundary.

B22t—23 to 28 inches; red (2.5YR 4/8) clay; weak medium subangular blocky structure; firm; patchy distinct clay films on faces of some peds; strongly acid; gradual wavy boundary.

B3—28 to 45 inches; red (2.5YR 4/8) clay; few medium distinct brownish yellow (10YR 6/6) mottles; massive; friable; strongly acid; gradual wavy boundary.

C—45 to 60 inches; red (2.5YR 4/8) clay; few medium distinct brownish yellow (10YR 6/6) mottles; massive; about 50 percent relict rock structure; strongly acid.

Solum thickness and depth to rock range from 40 to 60 inches. Unless the surface layer has been limed, reaction ranges from strongly acid to very strongly acid.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. Some pedons have an A1 horizon that has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. Texture is loam or silt loam.

The B2t horizon has hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 or 8. Texture is silty clay loam, silty clay, or clay.

The B3 horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8. Mottles in shades of brown and yellow are common. Texture is silty clay loam, silty clay, or clay.

The C horizon is massive, weathered phyllite with colors similar to those of the B3 horizon. Crushed textures are loam, clay loam, or clay.

Townley Series

The Townley series consists of moderately deep, well drained, slowly permeable soils that formed in residuum of shale and siltstone. These gently sloping to moderately steep soils are on ridgetops and side slopes of uplands. Slope ranges from 4 to 25 percent.

Townley soils are near Nauvoo, Quitman, Sunlight, and Sterrett soils. Nauvoo soils are on narrow ridgetops and have a fine-loamy control section. Quitman soils are along drainageways, are fine-loamy, and are moderately well drained. Sunlight soils are on steep side slopes and are underlain by siltstone at a depth of less than 20 inches. Sterrett soils are in depressional areas and are somewhat poorly drained.

Typical pedon of Townley silt loam, 4 to 12 percent slopes, in a wooded area 925 feet east and 550 feet north of the southwest corner of sec. 23, T. 20 S., R. 1 W.

A1—0 to 5 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; few medium and small roots; about 5 percent by volume siltstone fragments; very strongly acid; gradual smooth boundary.

B21t—5 to 10 inches; strong brown (7.5YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; many fine and medium roots; broken distinct clay films on faces of peds; about 5 percent by volume siltstone fragments; few wormholes and castings; very strongly acid; gradual smooth boundary.

B22t—10 to 23 inches; yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure parting to strong fine subangular blocky; firm; few fine and coarse roots; continuous distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

B23t—23 to 30 inches; yellowish red (5YR 5/8) clay; common medium distinct brownish yellow (10YR 6/8) mottles; strong medium subangular blocky structure parting to strong fine subangular blocky; firm; few coarse roots; continuous distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—30 to 40 inches; brownish yellow (10YR 6/8) silty clay; few medium distinct yellowish red (5YR 5/8) mottles; massive; firm; very strongly acid; gradual wavy boundary.

Cr—40 to 60 inches; brownish yellow tilted weathered shale and siltstone.

Solum thickness and depth to weathered bedrock range from 20 to 40 inches. Unless the surface has been limed, reaction ranges from strongly acid to very strongly acid.

The A horizon has hue of 7.5YR, 10YR, or 2.5Y; value of 3 through 5; and chroma of 3 through 6. Texture is fine sandy loam, loam, or silt loam.

The B2t horizon has hue of 7.5YR, 5YR, or 2.5YR; value of 4 or 5; and chroma of 4 through 8. Texture is silty clay loam, silty clay, or clay.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 8. Texture is clay or silty clay.

The lower part of the B2t horizon and the C horizon are mottled in shades of red, yellow, and brown.

The Cr material can be ripped with heavy equipment.

Tupelo Series

The Tupelo series consists of deep, somewhat poorly drained, slowly permeable soils that formed in clayey residuum and alluvium from limestone. These level and nearly level soils are along drainageways in depressional areas and on broad flats on uplands in limestone valleys. Slope ranges from 0 to 3 percent.

Tupelo soils are near Allen, Dewey, Decatur, Etowah, and Quitman soils. Allen, Dewey, Decatur, and Etowah soils are well drained and are on higher landscape positions than the Tupelo soils. Quitman soils are on slightly higher positions and are moderately well drained.

Typical pedon of Tupelo loam in an area of Tupelo-Dewey complex, in a wooded area 2,350 feet east and 2,400 feet south of the northwest corner of sec. 21, T. 21 S., R. 2 W.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) loam; weak fine granular structure; friable; common fine and medium roots; slightly acid; clear wavy boundary.

B21t—5 to 12 inches; light yellowish brown (2.5Y 6/4) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine and medium roots; faint patchy clay films on faces of some peds; slightly acid; clear wavy boundary.

B22t—12 to 26 inches; light olive brown (2.5Y 5/4) clay; common medium faint grayish brown (2.5Y 5/2) mottles and coatings; strong fine subangular blocky structure; few medium roots; firm; broken distinct clay films on faces of peds; many dark brown fine to medium concretions; neutral; clear wavy boundary.

B23tg—26 to 32 inches; mottled light gray (10YR 7/1), olive yellow (2.5Y 6/6), and yellowish brown (10YR 5/8) clay; strong fine subangular blocky structure; firm; broken distinct clay films on faces of peds; many dark brown fine to medium concretions; few small limestone fragments; neutral; clear wavy boundary.

B24tg—32 to 38 inches; light gray (N 7/0) clay; common fine distinct yellowish brown (10YR 5/6) mottles; strong fine subangular blocky structure; firm; broken distinct clay films on faces of peds; abundant fine to large dark brown concretions; few small limestone fragments; neutral; abrupt wavy boundary.

C1g—38 to 43 inches; dark gray (N 4/0) and dark grayish brown (2.5Y 4/2) clay; massive; very firm; neutral; clear wavy boundary.

C2—43 to 76 inches; mottled yellow, brown, and gray clay; massive; very firm; common dark brown medium to large concretions; neutral.

Solum thickness and depth to limestone bedrock range from 40 to more than 60 inches. Fine to large dark brown concretions range from few to abundant. Reaction is moderately acid to moderately alkaline.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. Texture is silt loam, loam, or silty clay loam.

The B1 horizon, where present, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8. Texture is silty clay loam, loam, or silt loam.

The upper part of the B2t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8. Mottles in shades of gray, yellow, or brown are common. The lower part of the B2t horizon is mottled in shades of gray, yellow, and brown; or it is neutral with value of 6 or 7. The B2t horizon is clay or silty clay.

The C horizon is the same in color and texture as the lower part of the B2t horizon.

Weogufka Series

The Weogufka series consists of shallow, well drained, moderately permeable soils that formed in residuum of slate or phyllite. These moderately steep to steep soils are on ridgetops and side slopes. Slope ranges from 15 to 60 percent.

Weogufka soils are near Quitman and Tatum soils. Tatum soils are on narrow ridgetops and have a red, clayey control section. Quitman soils are along drainageways and are moderately well drained.

Typical pedon of Weogufka very channery sandy loam, 15 to 35 percent slopes, in a wooded area 1,200 feet west and 300 feet north of the southeast corner of sec. 17, T. 24 N., R. 15 E.

A1—0 to 4 inches; dark yellowish brown (10YR 4/4) very channery sandy loam; weak fine granular structure; friable; many small and medium roots; about 40 percent by volume slate fragments more than 2 mm; strongly acid; clear smooth boundary.

B2t—4 to 10 inches; reddish brown (5YR 4/3) extremely channery loam; weak medium subangular blocky structure parting to weak fine subangular blocky; friable; many small and medium roots; patchy clay films on faces of peds and around fragments; about 60 percent by volume slate fragments more than 2 mm; strongly acid; gradual wavy boundary.

Cr—10 to 28 inches; reddish brown (5YR 4/3) weathered slate with pockets of B2t loam along fracture planes; about 95 percent by volume fragments more than 2 mm; strongly acid; diffuse broken boundary.

R—28 inches; hard, fractured slate bedrock.

Solum thickness ranges from 8 to 20 inches. Reaction ranges from medium acid to very strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 1 through 4. Texture is sandy loam, silt loam, or loam or their channery or very channery analogs. Percent of coarse fragments by volume ranges from 10 to 50 percent.

The B2t horizon has hue of 5YR, 7.5YR, or 10YR; value of 3 through 5; and chroma of 3 through 8. Texture is very channery silt loam, very channery silty clay loam, very channery clay loam, or the extremely channery analogs. Coarse fragments, by volume, range from 35 to 90 percent.

The Cr horizon consists of weathered tilted and fractured slate. Tongues of material from the B2t horizon extend into the underlying material to a depth of 3 feet or more along fracture planes.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the

building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion. *Erosion* (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1955-78 at Calera, Alabama]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	54.5	31.4	42.9	75	4	64	5.47	3.56	7.21	7	.6
February---	60.5	33.9	47.2	80	11	113	5.15	2.82	7.20	6	.1
March------	67.3	41.0	54.2	84	19	211	7.05	3.75	9.94	8	.0
April------	77.1	48.7	62.9	88	27	387	5.43	2.95	7.60	6	.0
May--------	83.9	56.1	70.0	95	35	620	4.06	1.49	6.19	5	.0
June-------	89.3	63.2	76.2	100	44	786	4.31	2.17	6.17	6	.0
July-------	91.4	66.9	79.2	100	54	905	4.98	2.74	6.96	7	.0
August-----	90.6	66.3	78.5	99	55	884	4.04	2.27	5.61	5	.0
September--	86.2	61.4	73.8	97	40	714	3.81	1.30	5.87	5	.0
October----	76.8	48.4	62.6	90	26	391	2.57	.84	4.03	3	.0
November---	65.9	39.6	52.7	83	15	148	3.47	2.30	4.54	5	.0
December---	58.5	33.6	46.1	77	9	70	5.19	2.81	7.29	7	.1
Year-----	75.2	49.2	62.2	102	3	5,293	55.53	47.63	63.15	70	.8

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1955-78 at Calera, Alabama]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 29	April 12	April 27
2 years in 10 later than--	March 22	April 6	April 21
5 years in 10 later than--	March 9	March 27	April 10
First freezing temperature in fall:			
1 year in 10 earlier than--	October 28	October 22	October 13
2 years in 10 earlier than--	November 3	October 27	October 18
5 years in 10 earlier than--	November 13	November 5	October 27

TABLE 3.--GROWING SEASON

[Recorded in the period 1955-78 at Calera, Alabama]

Probability	Length of growing season if daily minimum temperature is---		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	221	205	180
8 years in 10	231	211	187
5 years in 10	249	222	200
2 years in 10	267	233	212
1 year in 10	276	239	219

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AnB	Allen loam, 2 to 6 percent slopes	18,490	3.6
AnC	Allen loam, 6 to 10 percent slopes	13,860	2.7
AqC	Allen-Quitman-Urban land complex, 0 to 10 percent slopes	2,190	0.4
BmF	Bodine-Minvale complex, 25 to 45 percent slopes	17,880	3.5
BrF	Brilliant very channery loam, 6 to 45 percent slopes	2,910	0.6
Ch	Choccolocco loam, occasionally flooded	1,430	0.3
CS	Choccolocco-Sterrett association, frequently flooded	22,890	4.4
DeB2	Dewey clay loam, 2 to 6 percent slopes, eroded	1,770	0.3
DeC2	Dewey clay loam, 6 to 10 percent slopes, eroded	920	0.2
DtC	Dewey-Tupelo-Urban land complex, 0 to 8 percent slopes	960	0.2
DuB	Decatur silt loam, 2 to 6 percent slopes	2,390	0.5
DuC	Decatur silt loam, 6 to 10 percent slopes	6,870	1.3
DuD	Decatur silt loam, 10 to 15 percent slopes	830	0.2
DuX	Decatur-Urban land complex, 2 to 10 percent slopes	1,230	0.2
EtB	Etowah silt loam, 2 to 6 percent slopes	9,410	1.8
EtC	Etowah silt loam, 6 to 10 percent slopes	716	0.1
GrD	Gorgas-Rock outcrop complex, 6 to 15 percent slopes	1,670	0.3
GvC	Greenville loam, 2 to 10 percent slopes	750	0.2
HvD	Hanceville loam, 6 to 15 percent slopes	470	0.1
MfD	Minvale-Fullerton complex, 6 to 15 percent slopes	13,964	2.7
MfE	Minvale-Fullerton complex, 15 to 35 percent slopes	14,940	2.9
MuE	Minvale-Fullerton-Urban land complex, 6 to 25 percent slopes	2,290	0.4
NaC	Nauvoo loam, 2 to 8 percent slopes	1,460	0.3
NaD	Nauvoo loam, 8 to 15 percent slopes	3,210	0.6
NaE	Nauvoo loam, 15 to 35 percent slopes	9,220	1.8
NcD	Nauvoo-Sunlight complex, 8 to 15 percent slopes	7,380	1.4
NcE	Nauvoo-Sunlight complex, 15 to 25 percent slopes	98,610	19.1
NMS	Nella-Mountainburg association, steep	40,480	7.8
PmF	Pirum fine sandy loam, 25 to 60 percent slopes	7,830	1.5
Pt	Pits	2,150	0.4
QuB	Quitman loam, 0 to 4 percent slopes	14,450	2.8
SmC	Smithdale sandy loam, 5 to 8 percent slopes	1,540	0.3
SmD	Smithdale sandy loam, 8 to 15 percent slopes	1,160	0.2
St	Sterrett silt loam	5,530	1.1
TaD	Tatum silt loam, 4 to 12 percent slopes	4,600	0.9
ToD	Townley silt loam, 4 to 12 percent slopes	17,720	3.4
ToE	Townley silt loam, 12 to 18 percent slopes	19,710	3.8
TsE	Townley-Sunlight complex, 12 to 35 percent slopes	89,620	17.4
TtE	Townley-Urban land complex, 4 to 25 percent slopes	2,790	0.5
Tu	Tupelo loam, frequently flooded	8,120	1.6
TWS	Tatum-Weogufka association, steep	3,720	0.7
Tx	Tupelo-Dewey complex	4,090	0.8
WgE	Weogufka very channery sandy loam, 15 to 35 percent slopes	21,520	4.2
WgF	Weogufka very channery sandy loam, 35 to 60 percent slopes	6,620	1.3
	Water	6,120	1.2
	Total	516,480	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Cotton lint	Soybeans	Wheat	Pasture	Tall fescue	Bahiagrass	Grass-legume hay
	Lbs	Bu	Bu	AUM*	AUM*	AUM*	Tons
AnB Allen	750	35	54	6.5	---	---	---
AnC Allen	600	30	52	6.5	---	---	---
AqC Allen-Quitman-Urban land	---	---	---	---	---	---	---
BmF Bodine-Minvale	---	---	---	---	---	---	---
BrF Brilliant	---	---	---	---	---	---	---
Ch Choccolocco	850	35	40	---	9.0	---	---
CS**:							
Choccolocco	---	---	---	---	---	---	---
Sterrett	---	25	---	---	5.5	---	---
DeB2 Dewey	---	---	48	6.5	---	---	---
DeC2 Dewey	---	---	36	4.5	---	---	---
DtC Dewey-Tupelo-Urban land	---	---	---	---	---	---	---
DuB Decatur	900	30	45	8.5	---	---	---
DuC Decatur	850	30	40	8.0	---	---	---
DuD Decatur	---	---	30	7.5	---	---	---
DuX Decatur-Urban land	---	---	---	---	---	---	---
EtB Etowah	750	---	50	7.0	---	---	---
EtC Etowah	600	---	45	6.5	---	---	---
GrD Gorgas-Rock outcrop	---	---	---	---	---	---	---
GvC Greenville	700	25	---	---	---	---	---
HvD Hanceville	---	---	---	---	---	---	---
MfD Minvale-Fullerton	---	---	40	6.2	---	---	---
MfE Minvale-Fullerton	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Cotton lint	Soybeans	Wheat	Pasture	Tall fescue	Bahiagrass	Grass-legume hay
	Lbs	Bu	Bu	AUM*	AUM*	AUM*	Tons
MuE------------------------- Minvale-Fullerton-Urban land	---	---	---	---	---	---	---
NaC------------------------- Nauvoo	800	30	---	---	---	---	---
NaD------------------------- Nauvoo	---	---	---	---	---	---	---
NaE------------------------- Nauvoo	---	---	---	---	---	---	---
NcD------------------------- Nauvoo-Sunlight	---	---	---	---	---	---	---
NcE------------------------- Nauvoo-Sunlight	---	---	---	---	---	---	---
NMS**:							
Nella---------------------	---	---	---	---	---	---	---
Mountainburg--------------	---	---	---	---	3.0	---	---
PmF------------------------- Pirum	---	---	---	---	---	---	---
QuB------------------------- Quitman	600	30	---	---	9.0	10.0	---
SmC------------------------- Smithdale	600	30	---	---	---	8.0	---
SmD------------------------- Smithdale	400	25	---	---	---	8.0	---
St-------------------------- Sterrett	---	30	---	---	6.0	---	---
TaD------------------------- Tatum	---	30	45	7.5	---	---	2.5
ToD------------------------- Townley	450	---	---	5.0	---	---	---
ToE------------------------- Townley	---	---	---	4.5	---	---	---
TsE------------------------- Townley-Sunlight	---	---	---	---	---	---	---
TtE------------------------- Townley-Urban land	---	---	---	---	---	---	---
Tu-------------------------- Tupelo	---	35	---	7.0	---	---	---
TWS**:							
Tatum---------------------	---	---	35	7.0	---	---	2.0
Weogufka------------------	---	---	---	---	---	---	---
Tx-------------------------- Tupelo-Dewey	---	---	---	7.0	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Cotton lint	Soybeans	Wheat	Pasture	Tall fescue	Bahiagrass	Grass-legume hay
	Lbs	Bu	Bu	AUM*	AUM*	AUM*	Tons
WgE, WgF------------------ Weogufka	---	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity*: Common trees	Potential productivity*: Site index	Trees to plant
AnB, AnC----------- Allen	3o	Slight	Slight	Slight	Slight	Yellow-poplar------- Shortleaf pine------ Loblolly pine-------	90 70 80	Yellow-poplar, loblolly pine.
BmF**:								
Bodine------------	3f	Severe	Severe	Severe	Slight	Upland oaks--------- Shortleaf pine------ Loblolly pine-------	70 70 80	Loblolly pine.
Minvale-----------	3o	Severe	Severe	Slight	Slight	Yellow-poplar------- Shortleaf pine------ Loblolly pine------- Virginia pine-------	90 70 80 70	Yellow-poplar, loblolly pine.
BrF--------------- Brilliant	3x	Severe	Severe	Severe	Slight	American sycamore--- Loblolly pine------- Virginia pine------- Sweetgum------------ Eastern cottonwood--	80 80 70 80 90	American sycamore, loblolly pine***, Virginia pine***, eastern cottonwood.
Ch---------------- Choccolocco	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar-------	80 70 70 90	Loblolly pine, yellow-poplar.
CS**:								
Choccolocco-------	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar-------	80 70 70 90	Loblolly pine, yellow-poplar.
Sterrett----------	2w	Slight	Moderate	Slight	Slight	Sweetgum------------ Loblolly pine------- Shortleaf pine------ Water oak-----------	90 90 80 90	Sweetgum, loblolly pine, water oak.
DeB2-------------- Dewey	4c	Slight	Moderate	Moderate	Slight	Shortleaf pine------ Loblolly pine------- Upland oaks---------	60 70 60	Loblolly pine.
DeC2-------------- Dewey	4c	Slight	Moderate	Moderate	Slight	Loblolly pine------- Shortleaf pine------ Upland oaks---------	70 60 60	Loblolly pine.
DuB, DuC, DuD------ Decatur	3o	Slight	Slight	Slight	Slight	Shortleaf pine------ Yellow-poplar------- Loblolly pine-------	70 90 80	Yellow-poplar, loblolly pine.
EtB, EtC----------- Etowah	2o	Slight	Slight	Slight	Slight	Yellow-poplar------- Southern red oak---- Loblolly pine------- Shortleaf pine------	100 80 90 80	Yellow-poplar, loblolly pine.
GrD**:								
Gorgas------------	4d	Moderate	Moderate	Moderate	Severe	Loblolly pine------- Virginia pine------- Shortleaf pine------	70 60 60	Loblolly pine, Virginia pine.
Rock outcrop.								
GvC--------------- Greenville	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------	80 70	Loblolly pine.
HvD--------------- Hanceville	4o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Virginia pine-------	75 65 70	Loblolly pine.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity*: Common trees	Site index	Trees to plant
MfD**:								
Minvale	3o	Slight	Slight	Slight	Slight	Yellow-poplar Shortleaf pine Loblolly pine Virginia pine	90 70 80 70	Yellow-poplar, loblolly pine.
Fullerton	3o	Slight	Slight	Slight	Slight	Yellow-poplar White oak Southern red oak Loblolly pine Shortleaf pine Virginia pine	90 70 70 80 70 70	Loblolly pine.
MfE**:								
Minvale	3r	Moderate	Moderate	Slight	Slight	Yellow-poplar Shortleaf pine Loblolly pine Virginia pine	90 70 80 70	Yellow-poplar, loblolly pine.
Fullerton	3r	Moderate	Moderate	Slight	Slight	Yellow-poplar White oak Southern red oak Loblolly pine Shortleaf pine Virginia pine	90 70 70 80 70 70	Loblolly pine.
NaC, NaD Nauvoo	2o	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Virginia pine Yellow-poplar Sweetgum	89 80 80 100 90	Loblolly pine, yellow-poplar.
NaE Nauvoo	2r	Moderate	Moderate	Slight	Slight	Loblolly pine Shortleaf pine Virginia pine Yellow-poplar Sweetgum	89 80 80 100 90	Loblolly pine, yellow-poplar.
NcD**:								
Nauvoo	2o	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Virginia pine Yellow-poplar Sweetgum	89 80 80 100 90	Loblolly pine, yellow-poplar.
Sunlight	4d	Slight	Slight	Moderate	Severe	Loblolly pine Virginia pine Shortleaf pine	70 60 60	Loblolly pine.
NcE**:								
Nauvoo	2r	Moderate	Moderate	Slight	Slight	Loblolly pine Shortleaf pine Virginia pine Yellow-poplar Sweetgum	89 80 80 100 90	Loblolly pine. yellow-poplar.
Sunlight	4d	Moderate	Moderate	Moderate	Severe	Loblolly pine Virginia pine Shortleaf pine	70 60 60	Loblolly pine.
NMS**:								
Nella	3x	Severe	Severe	Slight	Slight	Yellow-poplar Shortleaf pine Virginia pine Upland oaks Longleaf pine	90 70 70 70 70	Yellow-poplar, loblolly pine.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordi- nation symbol	Management concerns: Erosion hazard	Management concerns: Equip- ment limita- tion	Management concerns: Seedling mortal- ity	Management concerns: Wind- throw hazard	Potential productivity*: Common trees	Potential productivity*: Site index	Trees to plant
NMS**:								
Mountainburg------	4d	Severe	Severe	Moderate	Severe	Shortleaf pine------	60	Loblolly pine, Virginia pine.
						Longleaf pine-------	60	
						Loblolly pine-------	70	
						Upland oak----------	60	
						Virginia pine-------	60	
PmF---------------- Pirum	3r	Severe	Severe	Slight	Slight	Loblolly pine-------	80	Loblolly pine.
						Shortleaf pine------	70	
						Upland oaks---------	70	
QuB---------------- Quitman	2w	Slight	Moderate	Slight	Slight	Water oak-----------	90	Loblolly pine, sweetgum, American sycamore.
						Loblolly pine-------	90	
						Sweetgum------------	95	
						American sycamore---	105	
SmC, SmD----------- Smithdale	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	80	Loblolly pine.
						Shortleaf pine------	70	
St----------------- Sterrett	2w	Slight	Moderate	Slight	Slight	Sweetgum------------	90	Sweetgum, loblolly pine, water oak.
						Loblolly pine-------	90	
						Shortleaf pine------	80	
						Water oak-----------	90	
TaD---------------- Tatum	4o	Slight	Slight	Slight	Slight	Upland oaks---------	60	Loblolly pine.
						Virginia pine-------	60	
						Shortleaf pine------	60	
						Loblolly pine-------	70	
ToD---------------- Townley	4c	Slight	Moderate	Slight	Moderate	Loblolly pine-------	70	Loblolly pine.
						Virginia pine-------	70	
						Shortleaf pine------	60	
ToE---------------- Townley	4r	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	70	Loblolly pine.
						Virginia pine-------	70	
						Shortleaf pine------	60	
TsE**:								
Townley-----------	4r	Moderate	Severe	Slight	Moderate	Loblolly pine-------	70	Loblolly pine.
						Virginia pine-------	70	
						Shortleaf pine------	60	
Sunlight----------	4d	Moderate	Moderate	Moderate	Severe	Loblolly pine-------	70	Loblolly pine.
						Virginia pine-------	60	
						Shortleaf pine------	60	
Tu----------------- Tupelo	3w	Slight	Moderate	Moderate	Slight	Yellow-poplar-------	90	Loblolly pine, sweetgum.
						Loblolly pine-------	80	
						Sweetgum------------	80	
TWS**:								
Tatum-------------	4r	Moderate	Moderate	Slight	Slight	Upland oak----------	60	Loblolly pine.
						Virginia pine-------	60	
						Shortleaf pine------	60	
						Loblolly pine-------	70	
Weogufka----------	4d	Moderate	Moderate	Moderate	Severe	Loblolly pine-------	70	Loblolly pine.
						Virginia pine-------	60	
						Shortleaf pine------	60	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity*		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
Tx**:								
Tupelo	3w	Slight	Moderate	Moderate	Slight	Yellow-poplar	90	Loblolly pine, sweetgum.
						Loblolly pine	80	
						Sweetgum	80	
Dewey	4c	Slight	Moderate	Moderate	Slight	White oak	60	Loblolly pine.
						Shortleaf pine	60	
						Loblolly pine	70	
WgE Weogufka	4d	Moderate	Moderate	Moderate	Severe	Loblolly pine	70	Loblolly pine.
						Virginia pine	60	
						Shortleaf pine	60	
WgF Weogufka	4d	Severe	Severe	Moderate	Severe	Loblolly pine	70	Loblolly pine.
						Virginia pine	60	
						Shortleaf pine	60	

*Site index rounded to nearest 5 feet.
**See description of the map unit for composition and behavior characteristics of the map unit.
***If pH is above 6.5, pines should not be planted.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
AnB------------------- Allen	Slight---------------	Slight---------------	Moderate: slope, small stones.	Slight.
AnC------------------- Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
AqC*:				
Allen-----------------	Slight---------------	Slight---------------	Severe: slope.	Slight.
Quitman---------------	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.
Urban land.				
BmF*:				
Bodine----------------	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
Minvale---------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
BrF------------------- Brilliant	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
Ch-------------------- Choccolocco	Severe: flooding.	Slight---------------	Moderate: flooding.	Slight.
CS*:				
Choccolocco-----------	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.
Sterrett--------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.
DeB2------------------ Dewey	Slight---------------	Slight---------------	Moderate: slope.	Slight.
DeC2------------------ Dewey	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
DtC*:				
Dewey-----------------	Slight---------------	Slight---------------	Moderate: slope.	Slight.
Tupelo----------------	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.
Urban land.				
DuB------------------- Decatur	Slight---------------	Slight---------------	Moderate: slope.	Slight.
DuC, DuD-------------- Decatur	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
DuX*:				
Decatur	Slight	Slight	Severe: slope.	Slight.
Urban land.				
EtB Etowah	Slight	Slight	Moderate: slope, small stones.	Slight.
EtC Etowah	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.
GrD*:				
Gorgas	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight.
Rock outcrop.				
GvC Greenville	Slight	Slight	Severe: slope.	Slight.
HvD Hanceville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
MfD*:				
Minvale	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
Fullerton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
MfE*:				
Minvale	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Fullerton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
MuE*:				
Minvale	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Fullerton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Urban land.				
NaC Nauvoo	Slight	Slight	Moderate: slope, small stones.	Slight.
NaD Nauvoo	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
NaE Nauvoo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
NcD*:				
Nauvoo	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Sunlight	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
NcE*:				
Nauvoo	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Sunlight	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
NMS*:				
Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mountainburg	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.
PmF Pirum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pt*. Pits				
QuB Quitman	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.
SmC Smithdale	Slight	Slight	Severe: slope.	Slight.
SmD Smithdale	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
St Sterrett	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
TaD Tatum	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.
ToD Townley	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Severe: erodes easily.
ToE Townley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: erodes easily.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
TsE*:				
Townley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: erodes easily.
Sunlight	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
TtE*:				
Townley	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Severe: erodes easily.
Urban land.				
Tu Tupelo	Severe: flooding, wetness.	Moderate: flooding, wetness, percs slowly.	Severe: wetness, flooding.	Moderate: wetness, flooding.
TWS*:				
Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.
Weogufka	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
Tx*:				
Tupelo	Severe: flooding, wetness.	Moderate: flooding, wetness, percs slowly.	Severe: wetness, flooding.	Moderate: wetness, flooding.
Dewey	Slight	Slight	Moderate: slope.	Slight.
WgE, WgF Weogufka	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AnB----------------- Allen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AnC----------------- Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AqC*:										
Allen--------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Quitman------------	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
BmF*:										
Bodine-------------	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Minvale------------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
BrF----------------- Brilliant	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ch------------------ Choccolocco	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CS*:										
Choccolocco--------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sterrett-----------	Poor	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
DeB2---------------- Dewey	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DeC2---------------- Dewey	Very poor.	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Poor	Poor	Very poor.
DtC*:										
Dewey--------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Tupelo-------------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Urban land.										
DuB, DuC, DuD------- Decatur	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DuX*:										
Decatur------------	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
EtB----------------- Etowah	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EtC----------------- Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
GrD*:										
Gorgas	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop.										
GvC: Greenville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HvD: Hanceville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MfD*:										
Minvale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Fullerton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MfE*:										
Minvale	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Fullerton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MuE*:										
Minvale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Fullerton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Urban land.										
NaC: Nauvoo	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NaD: Nauvoo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NaE: Nauvoo	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
NcD*:										
Nauvoo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sunlight	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
NcE*:										
Nauvoo	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sunlight	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
NMS*:										
Nella	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Mountainburg	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor	Poor	Very poor.	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
PmF----------------- Pirum	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Pt*. Pits										
QuB----------------- Quitman	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
SmC, SmD------------ Smithdale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
St------------------ Sterrett	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good.
TaD----------------- Tatum	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ToD----------------- Townley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ToE----------------- Townley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TsE*:										
Townley------------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sunlight-----------	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
TtE*:										
Townley------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
Tu------------------ Tupelo	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
TWS*:										
Tatum--------------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Weogufka-----------	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.
Tx*:										
Tupelo-------------	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Dewey--------------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WgE, WgF------------ Weogufka	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AnB---------------- Allen	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
AnC---------------- Allen	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AqC*: Allen-------------	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
Quitman-----------	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Moderate: wetness.
Urban land.						
BmF*: Bodine------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Minvale-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BrF---------------- Brilliant	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: small stones, slope.
Ch----------------- Choccolocco	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
CS*: Choccolocco------	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Sterrett----------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
DeB2--------------- Dewey	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
DeC2--------------- Dewey	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
DtC*: Dewey-------------	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
Tupelo------------	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Moderate: wetness, flooding.
Urban land.						
DuB---------------- Decatur	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength.	Slight.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
DuC, DuD: Decatur	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
DuX*:						
Decatur	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength.	Slight.
Urban land.						
EtB: Etowah	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
EtC: Etowah	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
GrD*:						
Gorgas	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Rock outcrop.						
GvC: Greenville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
HvD: Hanceville	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
MfD*:						
Minvale	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: small stones, slope.
Fullerton	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Severe: small stones.
MfE*:						
Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: small stones, slope.
MuE*:						
Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: small stones, slope.
Urban land.						
NaC: Nauvoo	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
NaD: Nauvoo	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
NaE: Nauvoo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
NcD*:						
Nauvoo	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Sunlight	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: thin layer.
NcE*:						
Nauvoo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sunlight	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: thin layer.
NMS*:						
Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mountainburg	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: thin layer, slope.
PmF Pirum	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pt*. Pits						
QuB Quitman	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
SmC Smithdale	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
SmD Smithdale	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
St Sterrett	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
TaD Tatum	Moderate: slope, too clayey.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
ToD Townley	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope, thin layer.
ToE Townley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
TsE*:						
Townley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Sunlight	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, thin layer.
TtE*:						
Townley	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope, thin layer.
Urban land.						
Tu Tupelo	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: flooding.
TWS*:						
Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Weogufka	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, thin layer.
Tx*:						
Tupelo	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: flooding.
Dewey	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
WgE, WgF Weogufka	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AnB: Allen	Moderate: perce slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
AnC: Allen	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AqC*:					
Allen	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Quitman	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Urban land.					
BmF*:					
Bodine	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
BrF: Brilliant	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Ch: Choccolocco	Severe: flooding.	Severe: seepage, flooding.	Severe: seepage, flooding.	Severe: flooding.	Good.
CS*:					
Choccolocco	Severe: flooding.	Severe: seepage, flooding.	Severe: seepage, flooding.	Severe: flooding.	Good.
Sterrett	Severe: flooding, wetness, percs slowly.	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
DeB2: Dewey	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
DeC2: Dewey	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
DtC*:					
Dewey	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DtC*:					
Tupelo	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Urban land.					
DuB Decatur	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
DuC, DuD Decatur	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
DuX*:					
Decatur	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
Urban land.					
EtB Etowah	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
EtC Etowah	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
GrD*:					
Gorgas	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
Rock outcrop.					
GvC Greenville	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
HvD Hanceville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
MfD*:					
Minvale	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones.
Fullerton	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: small stones, slope, too clayey.
MfE*:					
Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Fullerton	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MuE*:					
Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Fullerton	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
Urban land.					
NaC Nauvoo	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Slight	Fair: area reclaim, thin layer.
NaD Nauvoo	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: area reclaim, slope.
NaE Nauvoo	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
NcD*:					
Nauvoo	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: area reclaim, slope.
Sunlight	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
NcE*:					
Nauvoo	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Sunlight	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
NMS*:					
Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Mountainburg	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: area reclaim, seepage, small stones.
PmF Pirum	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Pt*. Pits					
QuB Quitman	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
SmC Smithdale	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SmD: Smithdale	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
St: Sterrett	Severe: flooding, wetness, percs slowly.	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
TaD: Tatum	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
ToD: Townley	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, thin layer.
ToE: Townley	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, slope.
TsE*:					
Townley	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, slope.
Sunlight	Severe: slope, depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
TtE*:					
Townley	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, thin layer.
Urban land.					
Tu: Tupelo	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
TWS*:					
Tatum	Severe: slope.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
Weogufka	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, thin layer, slope.
Tx*:					
Tupelo	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Dewey	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WgE, WgF: Weogufka	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, thin layer, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
AnB, AnC: Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
AqC*:				
Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Quitman	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Urban land.				
BmF*:				
Bodine	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Minvale	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
BrF: Brilliant	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Ch: Choccolocco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
CS*:				
Choccolocco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Sterrett	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
DeB2, DeC2: Dewey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
DtC*:				
Dewey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Tupelo	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
DuB, DuC, DuD: Decatur	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
DuX*:				
Decatur	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
EtB------------------- Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
EtC------------------- Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
GrD*:				
Gorgas----------------	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, thin layer.
Rock outcrop.				
GvC------------------- Greenville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
HvD------------------- Hanceville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MfD*:				
Minvale---------------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Fullerton-------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
MfE*:				
Minvale---------------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Fullerton-------------	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
MuE*:				
Minvale---------------	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Fullerton-------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
Urban land.				
NaC------------------- Nauvoo	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
NaD------------------- Nauvoo	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
NaE------------------- Nauvoo	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
NcD*:				
Nauvoo	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Sunlight	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
NcE*:				
Nauvoo	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Sunlight	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
NMS*:				
Nella	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Mountainburg	Poor: slope, thin layer, area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: slope, small stones, area reclaim.
PmF Pirum	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Pt*. Pits				
QuB Quitman	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
SmC Smithdale	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
SmD Smithdale	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
St Sterrett	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
TaD Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
ToD Townley	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
ToE------------------- Townley	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
TsE*:				
Townley--------------	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Sunlight-------------	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
TtE*:				
Townley--------------	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
Tu-------------------- Tupelo	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
TWS*:				
Tatum----------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Weogufka-------------	Poor: area reclaim, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, thin layer, slope.
Tx*:				
Tupelo---------------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Dewey----------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WgE, WgF-------------- Weogufka	Poor: area reclaim, thin layer, slope.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, thin layer, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AnB: Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
AnC: Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope	Slope.
AqC*:						
Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
Quitman	Slight	Severe: piping.	Slope	Wetness	Wetness	Favorable.
Urban land.						
BmF*:						
Bodine	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Minvale	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
BrF: Brilliant	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Ch: Choccolocco	Moderate: seepage.	Severe: piping.	Deep to water	Flooding	Erodes easily	Erodes easily.
CS*:						
Choccolocco	Moderate: seepage.	Severe: piping.	Deep to water	Flooding	Erodes easily	Erodes easily.
Sterrett	Slight	Severe: wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Not needed	Wetness, erodes easily, percs slowly.
DeB2: Dewey	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
DeC2: Dewey	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
DtC*:						
Dewey	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
Tupelo	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly.	Wetness, percs slowly.
Urban land.						
DuB: Decatur	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
DuC, DuD: Decatur	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
DuX*:						
Decatur	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
Urban land.						

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
EtB: Etowah	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Favorable	Favorable.
EtC: Etowah	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
GrD*:						
Gorgas	Severe: seepage, depth to rock.	Severe: thin layer, piping.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
GvC: Greenville	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope	Favorable	Favorable.
HvD: Hanceville	Severe: slope.	Slight	Deep to water	Slope	Slope	Slope.
MfD*:						
Minvale	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Fullerton	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
MfE*:						
Minvale	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Fullerton	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
MuE*:						
Minvale	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Fullerton	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Urban land.						
NaC: Nauvoo	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
NaD, NaE: Nauvoo	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
NcD*, NcE*:						
Nauvoo	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
Sunlight	Severe: seepage, depth to rock.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
NMS*:						
Nella	Severe: slope.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
NMS*:						
Mountainburg-----	Severe: depth to rock, seepage, slope.	Severe: thin layer, seepage.	Deep to water	Droughty, depth to rock, slope.	Large stones, depth to rock, slope.	Large stones, slope, droughty.
PmF--------------- Pirum	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
Pt*. Pits						
QuB--------------- Quitman	Slight---------	Severe: piping.	Slope----------	Wetness--------	Wetness--------	Favorable.
SmC--------------- Smithdale	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
SmD--------------- Smithdale	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
St---------------- Sterrett	Slight---------	Severe: wetness.	Percs slowly---	Wetness, percs slowly, erodes easily.	Not needed-----	Wetness, erodes easily, percs slowly.
TaD--------------- Tatum	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
ToD, ToE---------- Townley	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
TsE*:						
Townley----------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Sunlight---------	Severe: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
TtE*:						
Townley----------	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Urban land.						
Tu---------------- Tupelo	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly.	Wetness, percs slowly.
TWS*:						
Tatum------------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Weogufka---------	Severe: seepage, depth to rock.	Severe: thin layer, seepage.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
Tx*:						
Tupelo-----------	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly.	Wetness, percs slowly.
Dewey------------	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WgE, WgF---------- Weogufka	Severe: seepage, depth to rock, slope.	Severe: thin layer, seepage.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AnB, AnC: Allen	0-5	Loam	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
	5-54	Clay loam, sandy clay loam, loam.	CL-ML, CL	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	50-80	20-43	4-19
	54-64	Clay loam, sandy clay loam, clay.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7-6	0-10	85-100	70-98	60-95	45-80	21-48	5-22
AqC*:											
Allen	0-5	Loam	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
	5-54	Clay loam, sandy clay loam, loam.	CL-ML, CL	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	50-80	20-43	4-19
	54-64	Clay loam, sandy clay loam, clay.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7-6	0-10	85-100	70-98	60-95	45-80	21-48	5-22
Quitman	0-6	Loam	SM, ML	A-4, A-2	0	100	100	85-100	30-55	<20	NP-3
	6-35	Fine sandy loam, loam.	SC, CL, CL-ML, SM-SC	A-4, A-6	0	100	100	90-100	40-70	20-35	4-15
	35-70	Sandy clay loam, loam, clay loam.	CL, SC	A-6, A-7	0	100	100	90-100	40-65	25-45	11-20
Urban land.											
BmF*:											
Bodine	0-5	Cherty silt loam	ML, CL-ML, GM, SM	A-4, A-2, A-1-B	5-25	30-90	20-75	20-67	20-62	<30	NP-7
	5-22	Cherty silt loam, cherty silty clay loam, stony silt loam.	GM-GC, GC, SC, SM-SC	A-1, A-2, A-4, A-6	20-45	30-70	20-65	20-55	15-45	20-38	3-15
	22-72	Cherty silty clay loam, cherty clay loam, very cherty silt loam.	GC, GM, SC, SM	A-2	20-55	20-70	15-65	15-45	12-35	26-42	8-16
Minvale	0-6	Cherty silt loam	ML, CL, GM, GC	A-4	0-5	55-80	50-75	40-70	36-60	<30	NP-10
	6-50	Cherty silty clay loam, cherty silt loam, cherty loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	50-65	Cherty silty clay loam, cherty silty clay, cherty clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
BrF: Brilliant	0-62	Very channery loam.	SM, SC, SM-SC, SP-SM	A-2-4, A-2-6, A-1	15-30	40-90	15-75	10-40	9-30	<30	NP-16
Ch: Choccolocco	0-5	Loam	ML	A-4	0	94-100	85-100	70-98	60-90	28-40	NP-8
	5-47	Silty clay loam, silt loam, loam.	ML	A-4, A-6, A-7	0	95-100	95-100	85-98	60-95	35-45	7-14
	47-65	Sandy loam, loam	SM, ML, SM-SC, CL-ML	A-2, A-4	0	95-100	89-100	60-95	30-75	<35	NP-7
CS*:											
Choccolocco	0-5	Loam	ML	A-4	0	94-100	85-100	70-98	60-90	28-40	NP-8
	5-47	Silty clay loam, silt loam, loam.	ML	A-4, A-6, A-7	0	95-100	95-100	85-98	60-95	35-45	7-14
	47-65	Sandy loam, loam	SM, ML, SM-SC, CL-ML	A-2, A-4	0	95-100	89-100	60-95	30-75	<35	NP-7

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
CS*:											
Sterrett	0-8	Silt loam	ML	A-4	0	100	95-100	90-100	70-85	<30	NP-7
	8-14	Silt loam, loam	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	50-75	22-40	3-20
	14-58	Loam, clay loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	65-85	22-40	5-20
	58-74	Loam, sandy loam, sandy clay loam.	CL, SM, SC	A-4, A-6	0-5	95-100	90-100	40-60	35-55	22-40	3-20
DeB2, DeC2 Dewey	0-5	Clay loam	CL-ML, CL	A-4, A-6	0	90-100	80-100	75-95	65-80	24-30	5-11
	5-22	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-95	65-85	38-68	12-34
	22-70	Clay, silty clay, cherty clay.	CH, CL, MH, ML	A-6, A-7	0-5	65-100	60-100	55-95	50-85	38-68	12-34
DtC*:											
Dewey	0-5	Clay loam	CL-ML, CL	A-4, A-6	0	90-100	80-100	75-95	65-80	24-30	5-11
	5-22	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-95	65-85	38-68	12-34
	22-70	Clay, silty clay, cherty clay.	CH, CL, MH, ML	A-6, A-7	0-5	65-100	60-100	55-95	50-85	38-68	12-34
Tupelo	0-5	Loam	CL-ML, CL, ML	A-4, A-6	0	98-100	85-100	75-100	70-95	20-35	4-12
	5-12	Silty clay loam, silty clay, silt loam.	CL, CH, MH	A-6, A-7, A-4	0	100	95-100	90-100	85-95	30-55	9-27
	12-76	Clay, silty clay, silty clay loam.	CH, MH, CL	A-7	0	95-100	95-100	90-100	75-98	41-70	17-40
Urban land.											
DuB, DuC, DuD Decatur	0-6	Silt loam	CL, ML, CL-ML	A-4, A-6	0-3	90-100	90-98	85-98	65-80	<32	NP-12
	6-70	Clay	CL, ML, MH, CH	A-7, A-6	0-3	90-100	90-100	88-98	75-90	37-60	11-28
DuX*:											
Decatur	0-6	Silt loam	CL, ML, CL-ML	A-4, A-6	0-3	90-100	90-98	85-98	65-80	<32	NP-12
	6-70	Clay	CL, ML, MH, CH	A-7, A-6	0-3	90-100	90-100	88-98	75-90	37-60	11-28
Urban land.											
EtB, EtC Etowah	0-5	Silt loam	ML, CL, SM-SC, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
	5-60	Silty clay loam, clay loam, silt loam.	CL	A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
GrD*:											
Gorgas	0-6	Loamy sand	SM-SC, SM, ML	A-4, A-2-4	0-10	60-85	50-75	40-65	14-65	<30	NP-7
	6-14	Sandy loam, gravelly sandy loam, loam.	SM, ML, GM, GM-GC	A-4, A-2	0-15	55-100	55-100	45-100	25-65	<30	NP-7
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
GvC Greenville	0-5	Loam	CL, SC, CL-ML, SM-SC	A-4, A-6	0	95-100	95-100	75-95	45-75	20-35	6-15
	5-60	Sandy clay loam, sandy clay, clay.	CL, SC, ML	A-6, A-7, A-4	0	98-100	95-100	80-95	40-80	28-50	7-25

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HvD--------------- Hanceville	0-7	Loam-------------	SM, SC, CL, ML	A-4	0	95-100	90-100	75-98	45-75	<30	NP-10
	7-37	Clay loam, sandy clay, clay.	CL	A-6, A-7	0	95-100	95-100	90-100	51-95	30-50	11-25
	37-70	Clay loam, sandy clay loam, fine sandy loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	95-100	95-100	85-95	51-80	25-45	5-20
MfD*, MfE*:											
Minvale----------	0-6	Cherty silt loam	ML, CL, GM, GC	A-4	0-5	55-80	50-75	40-70	36-60	<30	NP-10
	6-50	Cherty silty clay loam, cherty silt loam, cherty loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	50-65	Cherty silty clay loam, cherty silty clay, cherty clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
Fullerton--------	0-6	Cherty silt loam	ML, CL-ML, CL, GM	A-2, A-4	2-15	60-94	45-80	40-75	30-70	16-30	3-10
	6-12	Cherty silty clay loam, cherty silt loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	12-63	Cherty clay, cherty silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42
MuE*:											
Minvale----------	0-6	Cherty silt loam	ML, CL, GM, GC	A-4	0-5	55-80	50-75	40-70	36-60	<30	NP-10
	6-50	Cherty silty clay loam, cherty silt loam, cherty loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	50-65	Cherty silty clay loam, cherty silty clay, cherty clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
Fullerton--------	0-6	Cherty silt loam	ML, CL-ML, CL, GM	A-2, A-4	2-15	60-94	45-80	40-75	30-70	16-30	3-10
	6-12	Cherty silty clay loam, cherty silt loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	12-63	Cherty clay, cherty silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42
Urban land.											
NaC, NaD, NaE---- Nauvoo	0-5	Loam-------------	SM-SC, CL-ML, SC, CL	A-4	0-3	90-100	85-100	55-93	35-65	<30	NP-8
	5-40	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	40-48	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
NcD*, NcE*:											
Nauvoo----------	0-5	Loam-------------	SM-SC, CL-ML, SC, CL	A-4	0-3	90-100	85-100	55-93	35-65	<30	NP-8
	5-40	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	40-48	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sunlight--------	0-2	Channery silt loam.	SM, ML, GM	A-4	0-5	50-85	50-80	35-70	35-60	<40	NP-10
	2-5	Channery sandy loam, channery silt loam, channery loam.	SM-SC, GC, GM-GC	A-4, A-6	0-10	50-85	50-80	35-70	35-60	20-40	4-15
	5-14	Very channery silt loam, very channery silty clay loam, very channery loam.	GC, GM-GC	A-2, A-4, A-1-B	0-10	40-65	35-60	35-50	20-40	20-40	4-15
	14-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
NMS*:											
Nella-----------	0-5	Cobbly sandy loam	ML, CL, SM, SC	A-4	10-25	90-100	85-90	65-75	36-55	<30	NP-8
	5-36	Cobbly clay loam, gravelly clay loam, cobbly sandy clay loam.	CL, SC, CL-ML, SM-SC	A-4, A-6, A-2	0-30	75-95	60-90	45-70	30-60	25-40	6-20
	36-70	Cobbly clay loam, gravelly sandy clay loam, cobbly clay.	SC, SM, CL, GC	A-4, A-6, A-7	0-25	85-95	75-90	65-80	40-65	30-55	8-27
Mountainburg----	0-3	Gravelly sandy loam.	GM, SM	A-1, A-2	0-15	60-80	50-70	20-40	15-30	---	NP
	3-15	Very gravelly sandy clay loam, very gravelly sandy loam, very gravelly loam.	GM, GC, GP-GM, GM-GC	A-1, A-2	15-30	40-60	30-50	25-50	10-25	<30	NP-10
	15-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
PmF-------------- Pirum	0-5	Fine sandy loam	SM, ML	A-4	0	75-100	75-100	70-90	35-65	<20	NP-3
	5-28	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0	75-100	75-100	70-90	50-70	22-35	5-15
	28-45	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Pt*. Pits											
QuB-------------- Quitman	0-6	Loam-------------	SM, ML	A-4, A-2	0	100	100	85-100	30-55	<20	NP-3
	6-35	Fine sandy loam, loam.	SC, CL, CL-ML, SM-SC	A-4, A-6	0	100	100	90-100	40-70	20-35	4-15
	35-70	Sandy clay loam, loam, clay loam.	CL, SC	A-6, A-7	0	100	100	90-100	40-65	25-45	11-20
SmC, SmD--------- Smithdale	0-5	Sandy loam-------	SM, SM-SC	A-4	0	100	85-100	60-80	36-49	<20	NP-5
	5-60	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	0	100	85-100	80-95	45-75	23-38	7-15

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
St-------------- Sterrett	0-8	Silt loam--------	ML	A-4	0	100	95-100	90-100	70-85	<30	NP-7
	8-14	Silt loam, loam	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	50-75	22-40	3-20
	14-58	Loam, clay loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	65-85	22-40	5-20
	58-74	Loam, sandy loam, sandy clay loam.	CL, SM, SC	A-4, A-6	0-5	95-100	90-100	40-60	35-55	22-40	3-20
TaD-------------- Tatum	0-6	Silt loam--------	ML, CL, SM	A-4	0	85-100	80-100	65-100	40-90	20-34	NP-10
	6-60	Silty clay loam, silty clay, clay.	MH	A-7	0	75-100	70-95	60-95	55-95	50-80	10-36
ToD, ToE--------- Townley	0-5	Silt loam--------	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	5-40	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-34
	40-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
TsE*: Townley---------	0-5	Silt loam--------	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	5-40	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-34
	40-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Sunlight--------	0-2	Channery silt loam.	SM, ML, GM	A-4	0-5	50-85	50-80	35-70	35-60	<40	NP-10
	2-5	Channery sandy loam, channery silt loam, channery loam.	SM-SC, GC, GM-GC	A-4, A-6	0-10	50-85	50-80	35-70	35-60	20-40	4-15
	5-14	Very channery silt loam, very channery silty clay loam, very channery loam.	GC, GM-GC	A-2, A-4, A-1-B	0-10	40-65	35-60	35-50	20-40	20-40	4-15
	14-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
TtE*: Townley---------	0-5	Silt loam--------	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	5-40	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-34
	40-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
TtE*: Urban land.											
Tu---------------- Tupelo	0-5	Loam--------------	CL-ML, CL, ML	A-4, A-6	0	98-100	85-100	75-100	70-95	20-35	4-12
	5-12	Silty clay loam, silty clay, silt loam.	CL, CH, MH	A-6, A-7, A-4	0	100	95-100	90-100	85-95	30-55	9-27
	12-76	Clay, silty clay, silty clay loam.	CH, MH, CL	A-7	0	95-100	95-100	90-100	75-98	41-70	17-40
TWS*: Tatum------------	0-6	Silt loam---------	ML, CL, SM	A-4	0	85-100	80-100	65-100	40-90	20-34	NP-10
	6-60	Silty clay loam, silty clay, clay.	MH	A-7	0	75-100	70-95	60-95	55-95	50-80	10-36
Weogufka---------	0-4	Channery silt loam.	SM, ML, GM	A-2, A-4	0-10	55-80	55-75	35-70	25-60	20-40	NP-10
	4-10	Very channery loam, very channery silty clay loam, very channery silt loam.	GM, GM-GC, SM, SM-SC	A-2, A-1-B	0-20	35-60	30-45	15-40	5-25	20-40	NP-10
	10-28	Weathered bedrock	---	---	---	---	---	---	---	---	---
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tx*: Tupelo-----------	0-76	Loam--------------	CL, CH, MH	A-6, A-7, A-4	0	100	95-100	90-100	85-95	30-55	9-27
Dewey------------	0-5	Clay loam---------	CL-ML, CL	A-4, A-6	0	90-100	80-100	75-95	65-80	24-30	5-11
	5-22	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-95	65-85	38-68	12-34
	22-70	Clay, silty clay, cherty clay.	CH, CL, MH, ML	A-6, A-7	0-5	65-100	60-100	55-95	50-85	38-68	12-34
WgE, WgF--------- Weogufka	0-4	Channery silt loam.	SM, ML, GM	A-2, A-4	0-10	55-80	55-75	35-70	25-60	20-40	NP-10
	4-10	Very channery loam, very channery silty clay loam, very channery silt loam.	GM, GM-GC, SM, SM-SC	A-2, A-1-B	0-20	35-60	30-45	15-40	5-25	20-40	NP-10
	10-28	Weathered bedrock	---	---	---	---	---	---	---	---	---
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
AnB, AnC: Allen	0-5	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28	5	.5-3
	5-54	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
	54-64	20-45	1.40-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low	0.20		
AqC*:										
Allen	0-5	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28	5	.5-3
	5-54	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
	54-64	20-45	1.40-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low	0.20		
Quitman	0-6	5-15	1.40-1.55	0.6-2.0	0.13-0.16	4.5-5.5	Low	0.28	5	1-3
	6-35	18-32	1.55-1.65	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28		
	35-70	18-35	1.50-1.60	0.2-0.6	0.10-0.18	4.5-5.5	Low	0.28		
Urban land.										
BmF*:										
Bodine	0-5	8-20	1.35-1.55	2.0-6.0	0.07-0.12	3.6-5.5	Low	0.28	5	---
	5-22	20-35	1.40-1.60	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.28		
	22-72	23-38	1.40-1.60	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.28		
Minvale	0-6	15-30	1.30-1.45	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.28	5	.5-2
	6-50	20-35	1.40-1.55	0.6-2.0	0.09-0.14	4.5-5.5	Low	0.28		
	50-65	25-45	1.40-1.55	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.28		
BrF: Brilliant	0-62	8-25	---	2.0-6.0	0.04-0.10	5.6-8.4	Low	0.24	5	<.5
Ch: Choccolocco	0-5	7-25	---	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.32	5	1-3
	5-47	25-35	---	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.37		
	47-65	10-30	---	2.0-6.0	0.10-0.16	4.5-6.0	Low	0.32		
CS*:										
Choccolocco	0-5	7-25	---	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.32	5	1-3
	5-47	25-35	---	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.37		
	47-65	10-30	---	2.0-6.0	0.10-0.16	4.5-6.0	Low	0.32		
Sterrett	0-8	5-20	1.40-1.55	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.37	5	1-3
	8-14	18-35	1.40-1.55	0.2-0.6	0.12-0.18	4.5-5.5	Moderate	0.32		
	14-58	18-35	1.50-1.70	0.06-0.2	0.12-0.18	4.5-5.5	Moderate	0.32		
	58-74	10-40	1.50-1.70	0.2-0.6	0.12-0.18	5.6-7.8	Moderate	0.32		
DeB2, DeC2: Dewey	0-5	17-27	1.35-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.32	5	1-3
	5-22	45-60	1.50-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Moderate	0.24		
	22-70	45-60	1.50-1.60	0.6-2.0	0.08-0.17	4.5-5.5	Moderate	0.24		
DtC*:										
Dewey	0-5	17-27	1.35-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.32	5	1-3
	5-22	45-60	1.50-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Moderate	0.24		
	22-70	45-60	1.50-1.60	0.6-2.0	0.08-0.17	4.5-5.5	Moderate	0.24		
Tupelo	0-5	18-32	1.35-1.50	0.6-2.0	0.18-0.22	4.5-6.0	Low	0.37	4	1-3
	5-12	25-45	1.40-1.55	0.6-2.0	0.17-0.21	4.5-6.0	Moderate	0.32		
	12-76	35-65	1.40-1.60	0.06-0.2	0.12-0.16	5.1-8.4	High	0.28		
Urban land.										
DuB, DuC, DuD: Decatur	0-6	15-27	1.25-1.55	0.6-2.0	0.18-0.20	4.5-6.0	Low	0.32	5	.5-2
	6-70	35-60	1.20-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Moderate	0.24		
DuX*:										
Decatur	0-6	15-27	1.25-1.55	0.6-2.0	0.18-0.20	4.5-6.0	Low	0.32	5	.5-2
	6-70	35-60	1.20-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Moderate	0.24		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
DuX*:										
Urban land.										
EtB, EtC----------	0-5	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low-----------	0.37	5	1-3
Etowah	5-60	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low-----------	0.32		
GrD*:										
Gorgas-----------	0-6	5-20	---	2.0-6.0	0.08-0.15	4.5-6.5	Low-----------	0.15	1	.5-2
	6-14	10-25	---	2.0-6.0	0.08-0.15	4.5-5.5	Low-----------	0.17		
	14	---	---	---	---	---	-------------	----		
Rock outcrop.										
GvC---------------	0-5	15-30	1.30-1.65	0.6-2.0	0.12-0.18	4.5-6.0	Low-----------	0.24	5	.5-1
Greenville	5-60	35-55	1.35-1.55	0.6-2.0	0.14-0.18	4.5-6.0	Low-----------	0.17		
HvD---------------	0-7	12-27	1.35-1.65	0.6-2.0	0.14-0.20	4.5-6.5	Low-----------	0.24	5	.5-2
Hanceville	7-37	35-50	1.30-1.60	0.6-2.0	0.14-0.20	4.5-5.5	Moderate------	0.28		
	37-70	15-40	1.30-1.60	0.6-2.0	0.14-0.20	4.5-5.5	Moderate------	0.24		
MfD*, MfE*:										
Minvale----------	0-6	15-30	1.30-1.45	2.0-6.0	0.10-0.15	4.5-5.5	Low-----------	0.28	5	.5-2
	6-50	20-35	1.40-1.55	0.6-2.0	0.09-0.14	4.5-5.5	Low-----------	0.28		
	50-65	25-45	1.40-1.55	0.6-2.0	0.08-0.14	4.5-5.5	Low-----------	0.28		
Fullerton--------	0-6	15-27	1.45-1.55	0.6-2.0	0.10-0.16	4.5-5.5	Low-----------	0.28	5	.5-2
	6-12	23-35	1.45-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low-----------	0.24		
	12-63	40-70	1.45-1.65	0.6-2.0	0.10-0.14	4.5-5.5	Moderate------	0.20		
MuE*:										
Minvale----------	0-6	15-30	1.30-1.45	2.0-6.0	0.10-0.15	4.5-5.5	Low-----------	0.28	5	.5-2
	6-50	20-35	1.40-1.55	0.6-2.0	0.09-0.14	4.5-5.5	Low-----------	0.28		
	50-65	25-45	1.40-1.55	0.6-2.0	0.08-0.14	4.5-5.5	Low-----------	0.28		
Fullerton--------	0-6	15-27	1.45-1.55	0.6-2.0	0.10-0.16	4.5-5.5	Low-----------	0.28	5	.5-2
	6-12	23-35	1.45-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low-----------	0.24		
	12-63	40-70	1.45-1.65	0.6-2.0	0.10-0.14	4.5-5.5	Moderate------	0.20		
Urban land.										
NaC, NaD, NaE----	0-5	10-20	---	2.0-6.0	0.13-0.17	4.5-6.0	Low-----------	0.28	3	.5-2
Nauvoo	5-40	18-35	---	0.6-2.0	0.14-0.20	4.5-6.0	Low-----------	0.32		
	40-48	15-30	---	0.6-2.0	0.11-0.17	4.5-6.0	Low-----------	0.32		
	48-60	---	---	---	---	---	-------------	----		
NcD*, NcE*:										
Nauvoo-----------	0-5	10-20	---	2.0-6.0	0.13-0.17	4.5-6.0	Low-----------	0.28	3	.5-2
	5-40	18-35	---	0.6-2.0	0.14-0.20	4.5-6.0	Low-----------	0.32		
	40-48	15-30	---	0.6-2.0	0.11-0.17	4.5-6.0	Low-----------	0.32		
	48-60	---	---	---	---	---	-------------	----		
Sunlight---------	0-2	10-20	1.40-1.60	0.6-2.0	0.08-0.14	4.5-5.5	Low-----------	0.24	1	1-2
	2-5	10-20	1.40-1.60	0.6-2.0	0.08-0.16	4.5-5.5	Low-----------	0.24		
	5-14	18-35	1.50-1.70	0.6-2.0	0.10-0.18	4.5-5.5	Low-----------	0.17		
	14-30	---	---	---	---	---	-------------	----		
NMS*:										
Nella------------	0-5	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low-----------	0.15	5	.5-3
	5-36	22-35	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low-----------	0.15		
	36-70	27-45	1.30-1.45	0.6-2.0	0.07-0.14	4.5-5.5	Low-----------	0.15		
Mountainburg-----	0-3	3-10	1.40-1.60	2.0-6.0	0.05-0.10	5.1-6.0	Low-----------	0.20	1	.5-1
	3-15	15-25	1.50-1.70	2.0-6.0	0.05-0.10	4.5-5.5	Low-----------	0.17		
	15-20	---	---	---	---	---	-------------	----		
PmF---------------	0-5	18-27	1.30-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low-----------	0.24	3	.5-2
Pirum	5-28	18-35	1.25-1.60	0.6-2.0	0.14-0.18	4.5-5.5	Low-----------	0.32		
	28-45	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
Pt*. Pits										
QuB---------------- Quitman	0-6	5-15	1.40-1.55	0.6-2.0	0.13-0.16	4.5-5.5	Low------------	0.28	5	1-3
	6-35	18-32	1.55-1.65	0.6-2.0	0.15-0.20	4.5-5.5	Low------------	0.28		
	35-70	18-35	1.50-1.60	0.2-0.6	0.10-0.18	4.5-5.5	Low------------	0.28		
SmC, SmD---------- Smithdale	0-5	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-5.5	Low------------	0.28	5	---
	5-60	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low------------	0.24		
St----------------- Sterrett	0-8	5-20	1.40-1.55	0.6-2.0	0.10-0.15	4.5-6.0	Low------------	0.37	5	1-3
	8-14	18-35	1.40-1.55	0.2-0.6	0.12-0.18	4.5-5.5	Moderate------	0.32		
	14-58	18-35	1.50-1.70	0.06-0.2	0.12-0.18	4.5-5.5	Moderate------	0.32		
	58-74	10-40	1.50-1.70	0.2-0.6	0.12-0.18	5.6-7.8	Moderate------	0.32		
TaD---------------- Tatum	0-6	12-27	1.10-1.40	0.6-2.0	0.14-0.20	4.5-5.5	Low------------	0.37	4	0-2
	6-60	45-60	1.40-1.60	0.6-2.0	0.10-0.19	4.5-5.5	Moderate------	0.28		
ToD, ToE---------- Townley	0-5	10-27	1.30-1.60	0.6-2.0	0.12-0.14	3.6-5.5	Low------------	0.37	3	<1
	5-40	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate------	0.28		
	40-60	---	---	---	---	---	--------------	----		
TsE*: Townley----------	0-5	10-27	1.30-1.60	0.6-2.0	0.12-0.14	3.6-5.5	Low------------	0.37	3	<1
	5-40	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate------	0.28		
	40-60	---	---	---	---	---	--------------	----		
Sunlight---------	0-2	10-20	1.40-1.60	0.6-2.0	0.08-0.14	4.5-5.5	Low------------	0.24	1	1-2
	2-5	10-20	1.40-1.60	0.6-2.0	0.08-0.16	4.5-5.5	Low------------	0.24		
	5-14	18-35	1.50-1.70	0.6-2.0	0.10-0.18	4.5-5.5	Low------------	0.17		
	14-30	---	---	---	---	---	--------------	----		
TtE*: Townley----------	0-5	10-27	1.30-1.60	0.6-2.0	0.12-0.14	3.6-5.5	Low------------	0.37	3	<1
	5-40	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate------	0.28		
	40-50	---	---	---	---	---	--------------	----		
Urban land.										
Tu----------------- Tupelo	0-5	18-32	1.35-1.50	0.6-2.0	0.18-0.22	4.5-6.0	Low------------	0.37	4	1-3
	5-12	25-45	1.40-1.55	0.6-2.0	0.17-0.21	4.5-6.0	Moderate------	0.32		
	12-76	35-65	1.40-1.60	0.06-0.2	0.12-0.16	5.1-8.4	High----------	0.28		
TWS*: Tatum------------	0-6	12-27	1.10-1.40	0.6-2.0	0.14-0.20	4.5-5.5	Low------------	0.37	4	0-2
	6-60	45-60	1.40-1.60	0.6-2.0	0.10-0.19	4.5-5.5	Moderate------	0.28		
Weogufka---------	0-4	10-20	1.30-1.60	0.6-2.0	0.10-0.14	4.5-6.0	Low------------	0.20	2	1-3
	4-10	10-30	1.30-1.60	0.6-2.0	0.10-0.14	4.5-5.5	Low------------	0.20		
	10-28	---	---	---	---	---	--------------	----		
	28	---	---	---	---	---	--------------	----		
Tx*: Tupelo-----------	0-76	25-45	1.40-1.55	0.6-2.0	0.17-0.21	4.5-6.0	Moderate------	0.32	---	---
Dewey------------	0-5	17-27	1.35-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low------------	0.32	5	1-3
	5-22	45-60	1.50-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Moderate------	0.24		
	22-70	45-60	1.50-1.60	0.6-2.0	0.08-0.17	4.5-5.5	Moderate------	0.24		
WgE, WgF---------- Weogufka	0-4	10-20	1.30-1.60	0.6-2.0	0.10-0.14	4.5-6.0	Low------------	0.20	2	1-3
	4-10	10-30	1.30-1.60	0.6-2.0	0.10-0.14	4.5-5.5	Low------------	0.20		
	10-28	---	---	---	---	---	--------------	----		
	28	---	---	---	---	---	--------------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AnB, AnC: Allen	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
AqC*:											
Allen	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
Quitman	C	None to occasional.	Very brief to brief.	Dec-May	1.5-2.0	Perched	Jan-Mar	>60	---	High	Moderate.
Urban land.											
BmF*:											
Bodine	B	None	---	---	>6.0	---	---	>60	---	Low	High.
Minvale	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low.
BrF: Brilliant	B	None	---	---	>6.0	---	---	>60	---	Low	Low.
Ch: Choccolocco	B	Occasional	Very brief	Nov-Mar	>6.0	---	---	>60	---	Moderate	Moderate.
CS*:											
Choccolocco	B	Frequent	Very brief	Nov-Mar	>6.0	---	---	>60	---	Moderate	Moderate.
Sterrett	D	Frequent	Very brief to brief.	Dec-Mar	0.5-1.5	Apparent	Dec-Mar	>60	---	High	Moderate.
DeB2, DeC2: Dewey	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
DtC*:											
Dewey	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Tupelo	D	Occasional	Brief	Dec-Apr	1.0-2.0	Apparent	Nov-Mar	40-80	Hard	High	Moderate.
Urban land.											
DuB, DuC, DuD: Decatur	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
DuX*:											
Decatur	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Urban land.											
EtB, EtC: Etowah	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
GrD*:											
Gorgas	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
Rock outcrop.											
GvC: Greenville	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
HvD: Hanceville	B	None	---	---	>6.0	---	---	>60	---	High	High.
MfD*, MfE*:											
Minvale	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low.
Fullerton	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
MuE*:											
Minvale----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.
Fullerton--------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Urban land.											
NaC, NaD, NaE----- Nauvoo	B	None--------	---	---	>6.0	---	---	40-60	Soft	Low------	High.
NcD*, NcE*:											
Nauvoo-----------	B	None--------	---	---	>6.0	---	---	40-60	Soft	Low------	High.
Sunlight---------	D	None--------	---	---	>6.0	---	---	10-20	Soft	Low------	High.
NMS*:											
Nella--------=---	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Mountainburg-----	D	None--------	---	---	>6.0	---	---	12-20	Hard	Low------	High.
PmF--------------- Pirum	B	None--------	---	---	>6.0	---	---	25-38	Hard	Low------	High.
Pt*. Pits											
QuB--------------- Quitman	C	None to occasional.	Very brief to brief.	Dec-May	1.5-2.0	Perched	Jan-Mar	>60	---	High-----	Moderate.
SmC, SmD---------- Smithdale	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
St---------------- Sterrett	D	Occasional	Very brief to brief.	Dec-Mar	0.5-1.5	Apparent	Dec-Mar	>60	---	High-----	Moderate.
TaD--------------- Tatum	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
ToD, ToE---------- Townley	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
TsE*:											
Townley----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
Sunlight---------	D	None--------	---	---	>6.0	---	---	10-20	Soft	Low------	High.
TtE*:											
Townley----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
Urban land.											
Tu---------------- Tupelo	D	Frequent----	Brief-----	Dec-Apr	1.0-2.0	Apparent	Nov-Mar	40-80	Hard	High-----	Moderate.
TWS*:											
Tatum------------	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
Weogufka---------	C	None--------	---	---	>6.0	---	---	8-20	Soft	Low------	High.
Tx*:											
Tupelo-----------	D	Frequent----	Brief-----	Dec-Apr	1.0-2.0	Apparent	Nov-Mar	40-80	Hard	High-----	Moderate.
Dewey------------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
WgE, WgF---------- Weogufka	C	None--------	---	---	>6.0	---	---	8-20	Soft	Low------	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL ANALYSES OF SELECTED SOILS

[Each pedon in this table is the typical pedon for the series]

Soil name, report number, horizon, and depth in inches	Particle-size distribution: Sand (2.0-0.005mm)	Particle-size distribution: Silt (0.05-0.002 mm)	Particle-size distribution: Clay (<0.002 mm)	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: K	Extractable acidity	Cation-exchange capacity	Base saturation	Reaction
	Pct			Meq/100g					Pct	pH
Allen:										
S79AL-117-20										
Ap------------------0-5	50.5	43.0	6.5	1.24	0.44	0.20	2.16	4.04	46.53	5.9
B1------------------5-11	42.0	41.2	16.8	0.80	0.44	0.08	3.60	4.92	26.83	5.2
B21t----------------11-41	43.8	36.7	19.5	0.80	0.16	0.04	4.00	5.00	20.00	4.9
B22t----------------41-54	43.6	32.4	24.0	0.36	0.32	0.04	5.12	5.84	12.33	4.7
B23t----------------54-64	50.1	26.8	23.1	0.24	0.20	0.04	4.64	5.12	9.38	4.5
Gorgas:										
S77AL-117-8										
A1------------------0-6	78.8	15.2	6.0	4.05	0.37	0.04	4.72	9.19	48.65	5.5
B2t-----------------6-14	66.3	23.2	10.5	0.45	0.08	0.02	2.80	3.35	16.63	5.3
Mountainburg:										
S79AL-117-13										
A1------------------0-3	71.1	22.7	6.2	15.88	1.11	0.27	5.20	22.47	76.85	6.0
B21t----------------3-8	68.1	21.0	10.9	0.52	0.07	0.04	2.08	2.71	23.33	4.9
B22t----------------8-15	79.3	11.3	9.4	0.44	0.05	0.03	1.36	1.88	28.03	4.9
Nauvoo:										
S79AL-117-19										
A1------------------0-2	47.1	41.0	11.9	8.28	0.68	0.12	3.68	12.76	71.16	5.9
A2------------------2-5	60.9	28.7	10.4	1.24	0.16	0.04	2.64	4.08	35.29	5.5
B21t----------------5-10	35.9	31.7	32.4	0.76	0.20	0.12	5.12	6.20	17.42	4.8
B22t----------------10-28	34.4	30.7	34.9	0.52	0.32	0.12	5.92	6.88	13.95	4.8
B23t----------------28-33	30.3	31.2	38.5	0.56	0.44	0.12	7.52	8.64	12.96	4.9
B3------------------33-40	41.0	24.2	34.8	0.32	0.24	0.08	8.00	8.64	7.41	4.8
C-------------------40-48	47.6	25.9	26.5	0.20	0.12	0.08	6.88	7.28	5.49	4.7
Quitman:										
S79AL-117-11										
Ap------------------0-6	48.1	41.9	10.0	1.22	0.11	0.06	2.16	3.55	39.25	5.1
B21t----------------6-13	39.6	42.2	18.2	0.58	0.05	0.03	2.16	2.82	23.57	4.6
B22t----------------13-35	33.2	46.6	20.2	0.50	0.09	0.03	4.72	5.34	11.70	4.8
B23t----------------35-70	28.3	48.5	23.2	0.28	0.20	0.04	4.48	5.00	10.53	4.7
Sterrett:										
S79AL-117-9										
Ap------------------0-4	22.0	69.6	8.4	2.56	0.83	0.14	3.84	7.37	47.96	5.0
A2------------------4-8	43.9	49.9	6.2	0.70	0.05	0.01	0.88	1.64	46.64	5.4
B21t----------------8-14	32.3	50.8	16.9	0.52	0.61	0.03	2.48	3.64	32.00	5.3
B22tg---------------14-40	20.9	45.7	33.4	0.24	3.11	0.07	6.72	10.14	33.79	5.1
B23tg---------------40-58	30.7	41.3	28.0	0.28	4.54	0.08	4.08	8.98	54.59	5.5
B3------------------58-74	48.1	36.2	15.7	0.28	2.60	0.04	1.92	4.84	60.36	6.0

TABLE 16.--PHYSICAL AND CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, report number, horizon, and depth in inches	Particle-size distribution: Sand (2.0-0.005mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Extractable bases: Ca	Mg	K	Extractable acidity	Cation-exchange capacity	Base saturation	Reaction
	Pct	Pct	Pct	Meq/100g	Meq/100g	Meq/100g	Meq/100g	Meq/100g	Pct	pH
Townley:										
S77AL-117-3										
A1-------------------0-5	7.4	72.4	20.2	0.66	0.18	0.18	9.60	10.58	9.26	4.5
B21t-----------------5-10	5.8	67.4	26.8	0.19	0.15	0.07	6.72	7.14	5.91	4.5
B22t----------------10-23	1.5	37.0	61.5	0.43	0.82	0.14	16.72	18.11	7.72	4.5
B23t----------------23-30	2.7	33.4	63.9	0.28	0.72	0.13	18.72	19.85	5.70	4.6
C-------------------30-40	2.1	40.7	57.2	0.23	0.60	0.11	15.68	16.63	5.71	4.9
Weogufka:										
S79AL-117-10										
A1-------------------0-4	57.0	30.2	12.8	9.38	1.16	0.28	4.64	15.47	70.00	5.4
B2t------------------4-10	38.0	42.2	19.8	0.42	0.53	0.04	2.80	3.79	26.28	5.1
Cr------------------10-28	42.7	42.2	15.1	0.28	0.58	0.03	2.32	3.21	27.89	5.1

TABLE 17.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution: Percentage passing sieve--							Liquid limit	Plasticity index	Moisture density	
	AASHTO	Unified	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200			Max. dry density	Optimum moisture
										Pct		Lb/ft3	Pct
Allen loam:[1] (S77AL-117-007)													
Ap----------------0 to 6	A-4(02)	SC	100	100	100	99	95	88	48	26	10	117	11
B21t--------------6 to 29	A-4(02)	CL	100	100	100	99	95	88	55	25	9	122	13
B22t-------------29 to 65	A-4(02)	CL-ML	100	100	100	99	95	87	51	22	5	125	10
Gorgas loamy sand:[2] (S77AL-117-008)													
A1----------------0 to 6	A-2-4(00)	SM	100	--	--	83	66	62	21.6	--	NP	99	17
B2t---------------6 to 14	A-2-4(00)	SM	100	--	--	95	89	86	28	--	NP	118	11
Hanceville loam:[3] (S77AL-117-001)													
Ap----------------0 to 7	A-4(02)	SM-SC	100	100	100	99	98	95	49	26	4	102	17
B21t--------------7 to 37	A-7-6(13)	CL	100	100	100	100	99	97	69	41	20	104	19
B22t-------------37 to 70	A-6(07)	ML	100	100	100	100	100	95	64	38	12	107	17
Townley silt loam:[4] (S77AL-117-003)													
A1----------------0 to 5	A-4(05)	ML	100	100	100	95	84	78	65	34	5	90	21
B21t, B22t, B23t--5 to 30	A-7-6(23)	MH	100	100	100	95	92	90	87	51	22	101	20
C----------------30 to 40	A-7-5(29)	MH	100	100	100	98	94	92	89	72	34	92	26

[1] Allen loam:
1,600 feet north and 950 feet east of the southwest corner of sec. 4, T. 20 S., R. 2 E.

[2] Gorgas loamy sand:
1,425 feet west and 800 feet north of the southeast corner of sec. 12, T. 20 S., R. 4 W.

[3] Hanceville loam:
600 feet west and 1,700 feet south of the northeast corner of sec. 14, T. 20 S., R. 4 W.

[4] Townley silt loam:
925 feet east and 550 feet north of the southwest corner of sec. 23, T. 20 S., R. 1 W.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Bodine	Loamy-skeletal, siliceous, thermic Typic Paleudults
Brilliant	Loamy-skeletal, mixed, nonacid, thermic Typic Udorthents
Choccolocco	Fine-silty, mixed, thermic Typic Hapludults
Decatur	Clayey, kaolinitic, thermic Rhodic Paleudults
Dewey	Clayey, kaolinitic, thermic Typic Paleudults
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Fullerton	Clayey, kaolinitic, thermic Typic Paleudults
Gorgas	Loamy, siliceous, thermic Lithic Hapludults
Greenville	Clayey, kaolinitic, thermic Rhodic Paleudults
Hanceville	Clayey, mixed, thermic Typic Rhodudults
Minvale	Fine-loamy, siliceous, thermic Typic Paleudults
Mountainburg	Loamy-skeletal, siliceous, thermic Lithic Hapludults
Nauvoo	Fine-loamy, siliceous, thermic Typic Hapludults
Nella	Fine-loamy, siliceous, thermic Typic Paleudults
Pirum	Fine-loamy, siliceous, thermic Typic Hapludults
Quitman	Fine-loamy, siliceous, thermic Aquic Paleudults
Smithdale	Fine-loamy, siliceous, thermic Typic Paleudults
Sterrett	Fine-loamy, siliceous, thermic Aeric Ochraqualfs
Sunlight	Loamy-skeletal, mixed, thermic Ochreptic Hapludults
Tatum	Clayey, mixed, thermic Typic Hapludults
Townley	Clayey, mixed, thermic Typic Hapludults
Tupelo	Fine, mixed, thermic Aquic Hapludalfs
Weogufka	Loamy-skeletal, mixed, thermic Ochreptic Hapludults

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